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OPERATION OF THE ANALYTICAL METHODOLOGY
INFORMATION CENTER

Ralph L. Darby, et al

Battelle Columbus Laboratories

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Operation of the Analytical Methodology Information Center



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Details are given for the first year of full-scale operation of the Analytical Methodology Information Center which was designed to collect, process, and disseminate information on analytical methods related to aquatic and marine environments for the Analytical Quality Control Laboratory and other elements of the National Analytical Methods Development Research Program. The main activities of the Center included an extensive acquisitions program, abstracting and indexing at the rate of about 200 items per month, providing abstracts to the Water Resources Scientific Information Center, publication of an abstract bulletin, maintenance of a computerized information/data base which is on-line interactive, provision of limited loan and copy services, and availability of quick response inquiry services. The value of the interactive information/data base has been further enhanced by the addition of chemical effects (toxicity) data. An additional study was conducted to evaluate the usefulness of SDI services to selected staff members as a means of broadening the AMIC screening process. An extensive group of EPA staff has been served by the Center via the abstract bulletin, the interactive information/data base, the loan and copy services, and the quick response inquiries. Because of interest in these activities outside EPA, plans are underway to permit access to these services on a cost-recovery basis. Recommendations are included for continued operation of the Center. (Little-Battelle) (EPA)

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ABSTRACT

Details are given for the first year of full-scale operation of the Analytical Methodology Information Center which was designed to collect, process, and disseminate information on analytical methods related to aquatic and marine environments for the Analytical Quality Control Laboratory and other elements of the National Analytical Methods Development Research Program.

The main activities of the Center included an extensive acquisitions program, abstracting and indexing at the rate of about 200 items per month, providing abstracts to the Water Resources Scientific Information Center, publication of an abstract bulletin, maintenance of a computerized information/data base which is on-line interactive, provision of limited loan and copy services, and availability of quick response inquiry services. The value of the interactive information/data base has been further enhanced by the addition of chemical effects (toxicity) data. An additional study was conducted to evaluate the usefulness of SDI services to selected staff members as a means of broadening the AMIC screening process. An extensive group of EPA staff has been served by the Center via the abstract bulletin, the interactive information/data base, the loan and copy services, and the quick response inquiries. Because of interest in these activities outside EPA, plans are underway to permit access to these services on a cost-recovery basis. Recommendations are included for continued operation of the Center.

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SECTION I

RECOMMENDATIONS

The first year of full-scale operation of the Analytical Methodology Information Center has strengthened the evidence that there is a definite need within the research community of EPA for a central depository of information on analytical methodology. Consequently, it is recommended that the Center be made a part of EPA's continuing programs and that plans be made to provide uninterrupted fiscal support as long as the Center responds to EPA needs. Several specific recommendations are detailed below.

1. The managers and staff of the Center should periodically review the scope of the Center to assure that information coverage correlates with the needs of the user community.
2. Consideration should be given to including other areas such as air, solid waste, and radiology in the scope of the Center.
3. Information processing with the Center's current scope should be about 300 items per month.
4. Further attempts should be made to obtain permission to use author abstracts with or without modification.
5. Publication of the current awareness (abstract) bulletin, "Reviews of Current Literature on Analytical Methodology and Quality Control", should be continued but consideration should be given to having copies printed by the General Services Administration or the Government Printing Office, provided publication can be accomplished in a timely manner.
6. As required by EPA agreements with the Office of Water Resources Research, U. S. Department of the Interior, the Center should continue to provide input to the Water Resources Scientific Information Center (WRSIC).
7. Limited loan and copy services should be continued until arrangements can be completed for an EPA library to provide these services. This library should also serve as a depository for all AMIC QRI's.

8. The computerized (on-line interactive) information/data base should be publicized more widely throughout EPA to allow wider access. As a corollary to this, each user facility should provide its own terminal, and consideration should be given to assessing each facility for the cost of its connect time. This latter consideration applies only until the information/data base is transferred to EPA's centralized system.
9. A definite plan should be developed for providing at least limited generic posting of index terms in the interactive information/data base and for employing other capabilities such as equivalencies.
10. The quick response inquiry (QRI) service should definitely be continued with consideration given to having each EPA user facility establish its own fund to cover costs of its QRI's.
11. EPA researchers requiring SDI services should obtain them through the EPA libraries.
12. To satisfy the "Freedom of Information Act", access to the interactive information/data base and other services should be provided to non-EPA facilities on a cost recovery basis.
13. As suggested in the section entitled "Possible Alternate Modes of Operation of the AMIC", cost-saving modifications in AMIC operations should continue to be studied and instituted where feasible.

SECTION II

INTRODUCTION

The following is a report of the activities of the Analytical Methodology Information Center during the first year of full-scale operation. The Center was operated under Contract Number 68-01-0166 with the Environmental Protection Agency from December 1, 1971, to November 30, 1972. Operations were based upon recommendations resulting from a prior design study and set forth in "Design and Operation of an Information Center on Analytical Methodology", (Ref. 1). As expected, some modifications in operations were necessary and the need for additional services became obvious.

Unfortunately, complications in contract renewal caused a lapse in information processing between contracts which prevented inclusion of some important information in the Center. Because of proliferation of information pertinent to the Center, emphasis was put on processing as much current information as possible. Consequently, it was not possible to process those documents published during the interim between contracts.

Basically, the Center has six responsibilities: (1) Acquisition, (2) Processing (abstracting and indexing) documents, (3) Preparation of a monthly current awareness (abstract) bulletin ("Reviews of Current Literature on Analytical Methodology and Quality Control"), (4) Provision of computerized (on-line interactive) computer system, (5) Assisting the Analytical Quality Control Laboratory in its role as a "center of competence" for the Water Resources Scientific Information Center, (6) Provision of certain information services. These activities are detailed in the following sections of this report.

The major accomplishments consisted of:

1. Acquisition of 3809 new documents and 1324 chemical effects documents.
2. Abstracting and indexing of 2440 documents.
3. Publication of 1919 abstracts in the current awareness (abstract) bulletin.
4. Loading of 2187 abstracts on the computerized (on-line interactive) information base.
5. Preparation, loading, and machine indexing of 343 references on the computerized information base.
6. Submission of 1968 abstracted and indexed documents to the Water Resources Scientific Information Center.
7. Preparation of 30 quick response inquiries.
8. Provision of 484 copies of prepared QRI's to numerous EPA facilities.
9. Preparation of a User Guide for the on-line information base.

10. On-line access to the information base by 13 EPA facilities.
11. Preparation of a pamphlet describing the AMIC services and activities.
12. Loan of documents to 12 EPA facilities.
13. Inclusion of chemical effects data in the information system.
14. Study of the value of SDI services.
15. Suggestions for alternative modes of AMIC operation.

SECTION III

SCOPE OF THE ANALYTICAL METHODOLOGY INFORMATION CENTER

The scope of interests for the Analytical Methodology Information Center (AMIC) developed during the FY-71 contract, provided the foundation for the acquisitions program of the operational AMIC. However, a number of events in FY-72 tended to broaden or reorient the scope of the Center relative to the aquatic and marine environments.

Discussions were held with personnel of EPA's Research Information Division and the Division of Processes and Effects, Measurements and Instrumentation Branch, concerning the possibility of including information on analytical methods applicable to the air environment along with that on the water environment. However, since the Center was costed to cover information on the water environment only, no further action was taken. This does not preclude the possibility or desirability of expanding the scope of the Center to include the air, soil, and radiology during later operations. Indeed, AMIC was approached by EPA-NERC, Las Vegas concerning the possibility of including radiology in the Center's scope.

Analytical Quality Control Laboratory

Contacts with the staff of the Analytical Quality Control Laboratory (AQCL) were continued during the contract to keep the Center informed of their current interests and thereby keep the scope of the Center current. These contacts resulted in some minor shifts in emphasis of interests, but no major modifications of scope. Examples of new topics of interest and shifts in emphasis according to activity include the following.

Microbiological Methods

Additional topics stated to be of interest include:

- Nuisance bacteria;
- Sulfur and iron bacteria;
- Methods for killing bacteria;
- Enrichment media for Salmonella

Chemical and Physical Methods

A. Oil Characterization. Additional topics specified include:

- Biological production of proteins from hydrocarbons;
- Spoilage of soybean and linseed oils;

Biological production of amino acids from petroleum;
Water soluble oils;
Copper and glycerides in oils;
Treatment of oil wastes.

B. Mass Spectroscopy. One revision in scope resulted from the formation of a mass spectroscopy group at the Analytical Quality Control Laboratory. This group is primarily interested in the uses and application of organic mass spectroscopy and nuclear magnetic resonance for analysis of pesticides, oils, petroleum, refractory organics (substances which are hard to decompose), polychlorinated biphenyls, and industrial effluents. They are also concerned with the application of small computers to analytical instrumentation.

Biological Methods

Additional topics of interest include:

Pesticide transport mechanisms;
Metabolic ion exchange mechanisms;
Data interpretation;
Drift organisms;
Stream repopulation; and
Sampling, sorting, and counting devices

Methods and Performance Evaluation

Additional topics of interest include:

Ultrapure water;
Preservation of biological, microbiological,
and chemical samples.

Instrumentation Methods

Additional topics of interest include:

Continuous monitoring of chlorophyll;
Surveys of ion sensors; and
Remote sensing of pollution.

Southeast Water Research Laboratory

Because of the role of the Southeast Water Research Laboratory in developing analytical methods for EPA, two of the AMIC staff visited that facility to brief the staff of the AMIC activities, instruct them in the use of the

information base, and to discuss their interests. As a result of these discussions, a number of new topics of interest were added. Basically, the analytical methods of interest are the same as those which are of interest to the AQCL, but with emphasis on different areas. Some areas of common interest include nuclear magnetic resonance; mass spectrometry; neutron activation analysis; atomic absorption; infrared spectroscopy; gas chromatography; laser raman techniques; ion-selective electrodes; anodic stripping; differential pulse, linear sweep, and cyclic voltammetry; and combined GC-mass spectrometry.

One of the important new concepts introduced during the discussions with the staff of the Southeast Water Research Laboratory and in some of the quick response inquiries (QRI's) was that of characterization of effluents and the effects of waste treatment processes on waste components. Of special concern were: characterization of domestic and municipal sewage; textile plant effluents; paper mill effluents; and petro-refinery and petrochemical effluents; dyes; dye carriers; pigments; steroids; amino acids; nitrogen bases; phenols; fatty acids; lipids; paper mill effluents such as terpenes, resin acids, and sugars; amines; aromatics; polycycloaromatics; phenolics; aliphatics; metals; metalorganics; and dissolved gases such as NH_3 , CO_2 , H_2S , and HCN .

Other interests included identification of impurities for characterization of pesticides, fourier transforms for NMR systems, mass spectra of environmental contaminants, hardware advances of analytical instrumentation, and sorption and interaction of clays such as montmorillonite and kaolinite with organics, especially pesticides.

National Environmental Research Center, Las Vegas

Recognizing the need for information services of the type offered by AMIC, one group of the National Environmental Research Center, Las Vegas (NERC-LV) requested an estimate of the cost of including radiology in the scope of the Center. Although no arrangements had been completed by the end of the contract period, the interest and intent of the inquiry demonstrate the need for AMIC services to be expanded to this and other areas.

Three basic areas were specified as being of interest to the Las Vegas program:

1. Physical and chemical methods, including alpha, beta, gamma, X-ray, and liquid scintillation spectroscopy and nuclear counting equipment and techniques.
2. Kinetics which would encompass transport mechanisms in soil, animals, plants, air, and water.
3. Remote sensing of SO_2 , NO_x , hydrocarbons, and general air pollution by laser and other techniques.

Although, as mentioned previously, it was not possible to include coverage of these topics in the Center, consideration should be given by EPA to including this area within the scope of the Center.

Quick Response Inquiries as a Source of Scope Information⁽¹⁾

As previously stated, the subjects of the Quick Response Inquiries are very important to AMIC as indicators of the current interests in the EPA and in some cases influenced the scope of the Center. One of the most important concepts was that of characterization and effects of effluents.

The QRI's which were concerned with these subjects were:

- QRI-21 "Heavy Metal Characterization of Sewage Plant Influent and Effluents"
- QRI-24 "Characterization of Effluents from Pharmaceutical Industries"
- QRI-27 "Toxicity of Furfural, Heptachlor, and Heptachlor Epoxide"
- QRI-32 "Effects of Chromium on Sewage Treatment and the Effects of Sewage Treatment on Chromium"
- QRI-34 "Slaughterhouse and Granary Wastes"
- QRI-37 "Methods of Characterization and Analysis of Bottom Sediments and Deposits"
- QRI-38 "Identification, Analysis and Effects of Organic Compounds in Kraft Paper Mill Wastes"
- QRI-43 "Effects of Dye Compounds in Domestic Wastes"

It should be pointed out that although coverage of the air environment was not officially included in the scope of the Center, two QRI's were prepared which were related to analysis of air pollutants. These were

- QRI-14 "Use of Semi-Conductor Materials for Monitoring Air Pollution"
- QRI-22 "Resonance Fluorescence of Active Gas-Phase Atomic Hydrogen, Oxygen, and Halogens, and Molecular OH, CO, and NO."

(1) For a more detailed discussion of QRI's see Section XI.

Summarizing Statements on Scope Modifications

It is well known that a specialized information center such as AMIC can remain viable only if its scope responds to shifting interests among its user audience. The scope of the Center must not remain static. Since AMIC utilizes an interactive computer-based information system, the AMIC staff is not aware of the subjects of searches being made of the information base by its various users. While personal contacts with the user community are the most valuable means of updating scope, these are not always possible. The nature of the QRI's forms an extremely valuable guideline of the interests and requirements of the user community. An examination of the titles of the QRI's, prepared during this contract period, is very illuminating both as to subject content and complexity of the inquiries. Some mechanism, therefore, must be available to keep the Center informed of shifts in interest. For the Analytical Methodology Information Center, personal contacts with the user community and preparation of QRI's have served this purpose well.

SECTION IV

INFORMATION PROCESSING

Information processing, as discussed in this section, included acquisition of information, logging and inventorying, abstracting and indexing, quality control, first typing, and editing/proofreading. The procedures employed were essentially those outlined in the report of the FY-71 design study. However, some activities of the Center during full-scale operation were noteworthy.

Acquisitions

Journals

The acquisitions program began with coverage of approximately 125 journals identified in the earlier study. Many of these journals were reviewed in the Battelle library; however, those which were shown previously to be highly productive were purchased on a subscription basis.

During the year, several efforts were undertaken to assure "good" coverage of the journal literature. Efforts made to identify additional sources of information at the Ohio State University library resulted in identification of 28 additional journals. Secondly, a number of additional journals were identified during discussions with technical persons in various EPA laboratories. Thirdly, one staff member at the Analytical Quality Control Laboratory provided a list of additional journals recommended for coverage.

The final list of journals reviewed for the Analytical Methodology Information Center along with the estimated number of pertinent items per year for each is included in Appendix A. Also shown in the list are those journals considered as being of such productivity as to warrant subscription by the Center rather than photocopying individual articles at the library. Additional journals identified as potential sources of information but not exploited because of time and fiscal limitations are also identified in Appendix A.

It should be noted that both the scope and number of pertinent articles on analytical methodology appear to be rapidly increasing. Operations for FY-72 were geared to process a total of approximately 2400 items. However, as a result of the screening of the current journals over 3153 items were identified and acquired for the Center. A similar increase should be anticipated for FY-73.

The acquisitions of the Center were significantly increased by the addition of 1324 documents used to prepare Volume III of the Water Quality Criteria Data Book, "Effects of Chemicals on Aquatic Life".

Report Literature

A determined effort was made by AMIC to assure coverage of the report literature. As in the pilot operation, Government Reports Announcements (GRA), published by the National Technical Information Service (NTIS) were regularly screened for non-EPA generated reports. In addition, EPA's reports were received directly from EPA's Publication Branch, resulting in a considerable savings in cost and time. Finally, letters were written to about 50 state and federal agencies requesting lists of their publications. Upon receipt of the lists, copies of pertinent publications were requested for inclusion in AMIC. Approximately 55 relevant reports were received as a result of this effort.

Abstracting and Indexing

Three responsibilities of the Center - preparation of the current awareness (abstract) bulletin, provision of a computerized information system, and inputting of abstracts into the Water Resources Scientific Information Center (WRSIC), are directly dependent upon the abstracting and indexing (A&I) efforts. It could be concluded, therefore, that this activity is the most fundamental and time-consuming activity of the Center.

Abstracts

During the course of the design study, considerable effort was directed toward defining the type of information to be included in an information system required by the AQCL users. Also, since AMIC was to assist the AQCL in its role as a "center of competence in analytical methodology" for the Water Resources Scientific Information Center (WRSIC), the nature of the abstracts prepared by AMIC had to conform to their specifications for "high quality, descriptive abstracts". Based upon the requirements of the AQCL user-audience, the abstracts should show the following concepts:

1. What is being done
2. How is it being done
3. What are the results

It was further determined that the abstracts should be quantitative in expressing results of various analytical methods (e.g., what is the sensitivity of the test and under what conditions; what were the results obtained; what are the detection limits; interferences etc.). This formula is applied where possible.

In an effort to reduce abstracting costs, "prepared" abstracts were used as much as possible. Permission to use prepared abstracts from several important technical journals was requested and received by the Center.

It should be noted, however, that many times prepared abstracts required modifications to orient them for the AQCL's interests. Nonetheless, the willingness of the publishers to allow use of their abstracts greatly facilitated preparation of abstracts for the Center. The average professional time required for abstracting and indexing to satisfy the standards established for AMIC was about 0.75 hour per document.

Table 1 shows the monthly rate of abstracting. As can be seen, the rate of processing started rather slowly and gradually reached the rate required. This occurred because of the time required to staff the Center, the need to initiate the acquisitions program before processing, and the training of the staff.

Indexing

Indexing requirements were also specified both by the AQCL users and by the WRSIC guidelines. However, on some occasions the requirements of the two were at cross purposes. The AQCL users required very extensive (deep) indexing, including scientific names, whereas WRSIC does not require this type of indexing. This problem has been largely resolved by letting WRSIC eliminate terms not needed for their system and by using certain terms only for AMIC. The depth of indexing being done at the Center was demonstrated by the data from a random sample of abstracts, which averaged 43 index terms per item. Of course, this level of indexing increases the total time required to prepare the abstracts. However, it is felt that this effort is well worthwhile because it reduces the amount of "noise" in retrievals and saves the user's time.

In addition to abstracting and indexing current reports, extensive effort was spent on re-indexing the documents processed during the first year's effort. The primary purpose of this indexing was to add generic terms to those items already on the information base. As of August 15, the vocabulary totalled approximately 14,400 terms.

Quality Control

Since several different persons were abstracting and indexing for the Center, all abstracts were reviewed by one or two experienced persons to assure consistency in indexing and in the quality of abstracts.

Typing

Several typing steps are needed to meet the requirements of the Center: (1) draft typing, (2) "Reviews" typing, and (3) WRSIC abstract typing. Because of these requirements, all typing was done on punch paper tape typewriters. As described in the FY-71 report the paper tapes were re-used to prepare the current abstract bulletin, the WRSIC abstracts, and as input into the computer-based information system. The procedures followed are shown in Figure 1 which is taken from the FY-71 report.

TABLE 1. MONTHLY RATE OF ACQUISITIONS, ABSTRACTING, AND INDEXING

Date	Abstracted and Indexed	Acquisitions
December	57	330
January	123	204
February	129	219
March	165	410
April	184	592
May	209	287
June	265	344
July	244	409
August	262	388
September	255	216
October	311	256
November	<u>236</u>	<u>154</u>
Totals	2440	3809

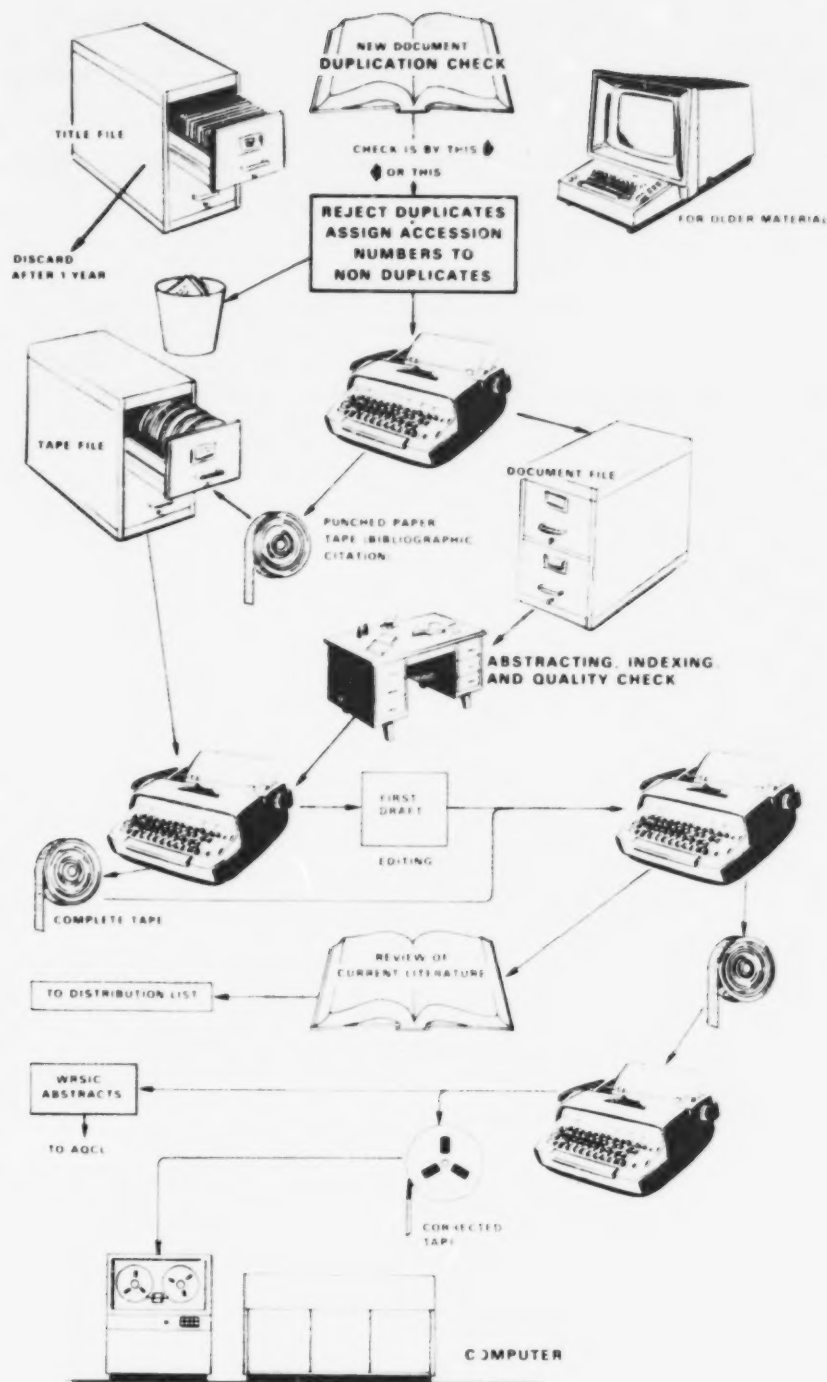


FIGURE 1. DOCUMENT PROCESSING PROCEDURES IN THE ANALYTICAL METHODOLOGY INFORMATION CENTER

A change in the format of the WRSIC abstracts necessitated a change in the paper tape format, as well as in the computer program for reading the paper tape. Fortunately, it was possible to make the new format compatible with the AMIC system at minimal cost and with few complications.

Subsequent to the draft typing, the abstracts were edited and proofread. No further proofing was required because the corrections were carried through the remaining processing.

Because the Center acquired a quite large backlog of older documents, an alternative method was used to load some of this material in the computer. This involved typing complete references for the items. When loaded on the computer, the titles could be searched on a free-text basis. Thus it was possible to partially process additional documents without involving the professional staff. Of course, these items are not as easily retrieved as processed items, nor is a detailed description of the content included; however, this method provides an inexpensive alternative to complete processing. Other alternatives are discussed in later sections.

SECTION V

CURRENT AWARENESS (ABSTRACT) BULLETIN

The current awareness bulletin, entitled "Reviews of Recent Literature on Analytical Methodology and Quality Control", proved to be one of the most important products of the Analytical Methodology Information Center, since it is a relatively inexpensive means of providing the benefit of the Center's activities to a large number of persons.

The format of the "Reviews" was essentially as established in the FY-71 study; that is, abstracts are printed in 3" x 5" format on card stock (see sample in Appendix B). However, several changes were introduced in the format. First, each issue was bound with a cover in report style. Second, issues for the staff of the Analytical Quality Control Laboratory were perforated to facilitate removal and filing of abstracts in personal files. Third, the page size was reduced to match that of standard government reports. At the same time, the cover was changed from blue to gray in compliance with an EPA directive which differentiated types of reports by the color of the cover.

The distribution of the "Reviews" to individuals reached a total of 249 per month by the end of the contract period. Because of this large distribution, 300 copies of each issue were printed beginning with the March issue. The distribution is shown in Appendix C.

In addition to the distribution to individuals, arrangements were made with the National Technical Information Service (NTIS) for announcing and selling the "Reviews" to persons and agencies outside EPA. As a result, 20 copies of each issue were mailed to NTIS with an option to purchase override copies or borrow camera-ready copy for in-house reproduction if necessary. Since NTIS received orders for about 30 subscriptions, they requested use of the camera-ready copies.

Two attempts were made to obtain evaluations of the "Reviews". The first evaluation forms were sent to the AQCL staff with the January issue of the "Reviews". A summary of the evaluations is shown in Table 2, along with the comments that were included. As can be seen, all items were of some degree of interest, with 79 percent (total of "high interest" and "useful") of these unquestionably important. The percentage of low interest items may be somewhat inaccurate since those responses were obtained from one group with a low number of returns.

The second attempt to obtain evaluations was unsuccessful. EPA staff receiving the fifth issue of the "Reviews" also received the evaluation form. (Previous evaluations were provided only by the AQCL staff.) Unfortunately, the returns of the evaluation forms were so small that

TABLE 2. SUMMARY OF EVALUATIONS FROM THE JANUARY ISSUE OF THE "REVIEWS"

High Interest	Useful	Low Interest	Not of Interest
52%	27%	21%	0

COMMENTS

"It would be useful to have more abstracts concerning instrumental methods of organic analysis, especially with trace amounts of compound. The 'Reviews of Current Literature' is a very helpful tool."

"Very helpful."

"Nearly all of the references in categories a and b, I have already seen and/or requested copies."

"Very useful set of reviews."

"You are doing better, you listed six papers in my field which I had not been familiar with."

"Good job!"

"There aren't many abstracts on sensors, instruments, etc. Otherwise, review excellent."

"Send reports marked."

"If copies cannot be obtained please advise me so that other measures can be taken to obtain the desired materials."

they were useless. However, the requests for copies of the "Reviews", as well as the occasional comments made during telephone conversations indicated favorable reactions.

In addition to the interest expressed by EPA personnel, a number of inquiries were received from other governmental and non-governmental agencies. These resulted from a news release issued by Battelle and an announcement in the AQCL Newsletter describing the Center. Because of the limited number of copies available, all requests from non-EPA persons were referred to NTIS. The companies expressing interest in the Analytical Methodology Information Center (Reviews and information base) are shown in Table 16.

A total of 10 issues of the "Reviews" were prepared under the present contract. These contained abstracts of articles considered to be most timely and important. Table 3 shows the number of abstracts and the number of pages in each issue.

TABLE 3. NUMBER OF PAGES AND ABSTRACTS IN EACH ISSUE OF THE "REVIEWS"

Issue No.	Number of Abstracts	Number of Pages
4	119	36
5	186	49
6	202	60
7	229	62
8	274	75
9	204	60
10	195	54
11	161	44
12	165	46
13	184	51

SECTION VI

WATER RESOURCES SCIENTIFIC INFORMATION CENTER INTERFACE

One of the roles assigned to the Analytical Methodology Information Center was to assist the Analytical Quality Control Laboratory in its role as "Center of Competence in Methods for Chemical and Biological Identification and Measurement of Pollutants" in providing input to WRSIC. Consequently, during the contract, 1968 abstracted items with copies of originals were provided to WRSIC. These abstracts were prepared on WRSIC forms in accordance with WRSIC specifications. Of the total number of documents abstracted, approximately 1968 were not submitted because they were duplicates of documents WRSIC already had or were items considered to be too old for WRSIC input (prior to June, 1970). It should be noted that although in some cases the items acquired by AMIC were duplicates of WRSIC material, the abstracts frequently required re-orienting for AMIC purposes. Where this was not required, abstracts of reports were used without modification. An additional 200 abstracts which were prepared during the final month of the contract were not submitted because the time lag between abstracting and indexing did not permit completion of the WRSIC forms before the contract termination and because of failure of an immediate contract extension.

In an attempt to avoid duplication of machining costs for inputting AMIC-prepared material into WRSIC, a sample paper tape was supplied to NTIS, who machines the WRSIC abstracts, for evaluation. On the basis of this test, NTIS concluded that it would not be feasible to employ the paper tapes prepared by AMIC.

WRSIC has on several occasions assisted AMIC by providing computer searches of their data base for use in preparing quick response inquiries (QRI's). These searches were on:

1. Bioassay and biomonitoring of water pollutants
2. Identification and analysis of wood materials
3. Methods of analysis of BOD.

SECTION VII

LOAN AND COPY SERVICES

Requests for document loans and copy services arise naturally out of the activities of information centers. The Analytical Methodology Information Center was no exception. Publication of the "Reviews of Current Literature on Analytical Methodology and Quality Control", operation of interactive information base, and contacts with EPA personnel made AMIC a focal point for these services. However, since EPA has an extensive library system, AMIC attempted to minimize its own role in these services except with the research staff at the Analytical Quality Control Laboratory.

The loan services provided for the AQCL staff consisted primarily of loaning, ordering, or copying documents available within AMIC. The Center facilitated requests for loans by including request forms with several issues of the "Reviews". These required only that the requester check the items needed, sign his name, staple the form, and mail it. This increased the demand for the service somewhat, but not greatly. Requests for large numbers of documents which were not available within the Center were relayed to the NERC-Cincinnati library for action. Since the Center has not and should not attempt to function as a library, these requests were deferred to EPA libraries except when a direct response would prove to be more beneficial for the requester.

On several occasions it was necessary for the Center to respond to requests for loans because of the urgency of the request or because of the lack of nearby library facilities.

Table 4 shows the EPA facilities which used the Center's loan and copy services along with the number of documents loaned or copied.

TABLE 4. EPA FACILITIES WHICH USED AMIC LOAN AND COPY SERVICES

Facility	No. of Items
Analytical Quality Control Laboratory, National Environmental Research Center, Cincinnati, Ohio	169
National Coastal Pollution Research Program, National Environmental Research Center, Corvallis, Oregon	2
National Environmental Research Center Library, Cincinnati, Ohio	2
National Marine Water Quality Laboratory, West Kingston, Rhode Island	1
Northwest Water Supply Laboratory, Gig Harbor, Washington	17
Region II, Edison Water Quality Laboratory, Edison, New Jersey	1
Region III, Annapolis Field Office, Annapolis Science Center, Annapolis, Maryland	16
Region III, Surveillance and Analysis Branch, Philadelphia, Pennsylvania	6
Region V, Chicago, Illinois	46
Region X, Seattle, Washington	33
Techniques Branch, Monitoring Techniques Division, Washington, D.C.	6
Water Quality Non Point Source Center Control Division, Office of Water Programs, Washington, D.C.	1

SECTION VIII

COMPUTERIZED (ON-LINE INTERACTIVE) INFORMATION BASE

Information processed by AMIC during the two contract periods is available for searches on a real-time, direct-access basis via remote terminal. The system used, known as BASIS-70, employs a user-oriented software package developed by Battelle especially for use by engineers and scientists and can be operated even by persons who may not be familiar with computerized information systems. The system requires a minimum of operator training and utilizes natural language rather than coded instructions.

Since the BASIS-70 system was described in detail in the earlier report, only brief mention of its capabilities will be included here. Options which are available and most of which were utilized by AMIC, are shown in Table 5.

At the present time, BASIS-70 is based on a CDC-6400 computer which is dedicated to servicing on-line real-time jobs. A CDC Cyber 73 serves as backup in the event of failure of the CDC 6400. AMIC is available at 110, 300, and 2000 BAUD (10, 30, and 200 characters per second).

User Guide

Because of plans to make the on-line interactive system available to EPA personnel at several laboratories, the need for an instructional manual for these users was recognized early. Although a general manual describing the BASIS-70 system was available, it was felt that it was not suitably oriented for the users of the AMIC information base. Consequently, a manual was prepared specifically for users of AMIC. A copy of the manual is included in Appendix D. As can be seen, the manual is prepared in "cookbook" format with sample searches to demonstrate each of the system capabilities.

Updates

After full-scale operations began, one of the first efforts was to machine 213 documents abstracted during the first contract and load them on the information base. These were added to the information base in January. Plans called for monthly updating of the base; however, because of delays in staffing the Center and the demands for preparing the "Reviews", it was not possible to maintain a strict schedule for updating.

TABLE 5. BASIS-70 CAPABILITIES

CAPABILITY	AMIC USE
Boolean AND/OR search strategy	Regular index and special index files
Special index files	Authors, Facility, Title words (older literature), Chemical effects
Adjacent term display	To determine or suggest correct entry forms
Stem searches	To explore index vocabulary
Machine indexing	Title words (older literature), may also be used for free-text indexing.
Off-line printing	To permit high speed printouts of lengthy searches

Table 6 lists the dates and quantity of each update. It should be noted that because of unavoidable human errors and equipment errors, not all documents that were prepared got in the information base. Those which were rejected were corrected and entered at a subsequent update. As noted in the section entitled "Information Processing", 343 unabstracted documents were prepared for loading in the information base. Paper tapes were prepared of the titles, authors, bibliographic citations, etc., and read onto the computer. The basic tape-reading program was modified so that when documents were not abstracted and indexed, title words were added to the vocabulary list as index terms. To differentiate these items from those completely processed, the index terms were prefixed with "TW". As stated earlier this capability was employed so that older material could be loaded inexpensively. The User Guide was modified to include a description of this capability since the title word searching has severe limitations and requires much more ingenuity on the part of the searcher. This is evident if one takes a small sample of documents and compares the concepts indicated in the titles with the content of the texts.

Size of the Information Base

The total number of characters in the information base at the end of the contract period was 8,597,120, including index terms. This total is comprised from a mix of approximately 1738 abstracted and indexed documents, approximately 197 title and bibliographic citations, and approximately 757 lines of data from approximately 72 documents. The "chemical effects" data added significantly to the total computer storage required for the AMIC information base. Because of the mix and the wide range in size of each type, it is not possible to calculate a meaningful average size by dividing the total numbers of items into the total characters in storage. However, calculations not included here show the average characters per abstracted and indexed document to be approximately 4632. This is somewhat greater than the 4570 average size of the first year's operation. Although the number of index terms per item increased, relatively less storage space was required since many terms are duplicates and consequently require additional storage only for accession numbers.

Users of the On-Line Interactive Information Base

Recommendations made during the first contract year called for computer terminals to be installed at four locations: (1) at the Analytical Quality Control Laboratory; (2) at EPA Headquarters; (3) in the Center itself; and (4) at another EPA laboratory to be specified by the Project Officer. However, these recommendations were modified because of changes in EPA activities and needs for access to the information base. The result was that three terminals were provided under the contract - one at the AMIC, one at the Analytical Quality Control Laboratory, and one at

TABLE 6. DATES AND NUMBER OF ITEMS ADDED AT EACH UPDATE OF THE
ON-LINE INTERACTIVE INFORMATION BASE

Dates	Documents	Unabstracted Items*	Chemical Effects Data Points
January 28, 1972	213	--	--
March 25, 1972	261	--	--
March 27, 1972	269	--	--
April 18, 1972	164	217	--
May 26, 1972	306	126	--
July 24, 1972	272	--	--
August 29, 1972			378
September 11, 1972	235	--	--
October 17, 1972	467		568
Total	<u>2187</u>	<u>343</u>	<u>946</u>

* See page 21 for description.

the Southeast Water Laboratory in Athens, Georgia. However, in addition to the terminals supported by the contract, eleven additional EPA facilities and one non-EPA Federal facility were given access to the information base via their own terminals. Outside of the Center then, a total of 58 persons were assigned access codes to use the system. Table 7 is a list of the facilities having access to the computerized information base and the number of persons assigned user codes. It should be noted, however, that these numbers are not truly representative of the total users because in some cases, persons passed their user codes on to their co-workers. Figure 2 shows the total monthly connect time used by persons outside the Center. No real trends in usage can be seen from the figure. The only account that can be given for the sharp drop in usage during June is that apparently many users were on vacation.

The average monthly use was 392 minutes, somewhat below the expected rate. However, it is anticipated that as the base grows and becomes available to more persons, the usage will rise. Of course, the more the information base is used the more value EPA receives for its investment.

Computer Terminals

The computer terminals chosen by the AMIC staff in consultation with the BASIS-70 staff were variable speed (110-1200 BAUD) cathode ray tubes (CRT) with matched electrostatic printers. These terminals combined the convenience of the CRT display with the accompanying hard copy for reference. The terminals also proved to be adaptable for use with other EPA computer systems.

The terminals supported by the Center were placed at various dates. The terminal in the Center was available shortly after renewal of the contract. The terminal was not placed at the AQCL until the material left over from the FY-71 contract was re-indexed and added to the information base (February, 1972).

A terminal was shipped to the Southeast Water laboratory in April, 1972. However, since space and telephone facilities were not immediately available, this terminal was not available for use until July. Two AMIC staff members visited the Southeast Water Research Laboratory in July and spent the day briefing the staff on the AMIC project and instructing them in the use of the information base.

Instructions for Using the AMIC Information Base

The AMIC staff personally instructed the staff of the AQCL and the Southeast Water Laboratory in the use of the information base. Other users were provided with User Guides. Although facilities with terminals also have trained operators, because of the nuances of each computer system, it is advisable that users be personally trained.

TABLE 7. FACILITIES WITH ACCESS TO THE AMIC INFORMATION BASE

EPA Facilities	Number of Persons Assigned User Codes
Division of Oil and Hazardous Materials, Washington, D.C.	1
National Field Investigations Center, Cincinnati	1
National Water Quality Laboratory, Duluth	1
Research Information Division, Washington, D.C.	2
Management Division, San Francisco	1
National Field Investigations Center, Denver	1
Analytical Quality Control Laboratory, Cincinnati	30
Measurements and Instrumentation Branch, Washington, D.C.	1
Division of Chemistry and Physics, Research Triangle Park	1
Pacific Northwest Water Laboratory, Corvallis	1
Southeast Water Laboratory, Athens	13
Western Environmental Research Laboratory, Las Vegas	1
National Environmental Research Center, Cincinnati	1
Non-EPA Facilities	
Environmental Information Systems Office, Oak Ridge National Laboratory, Oak Ridge, Tennessee	2

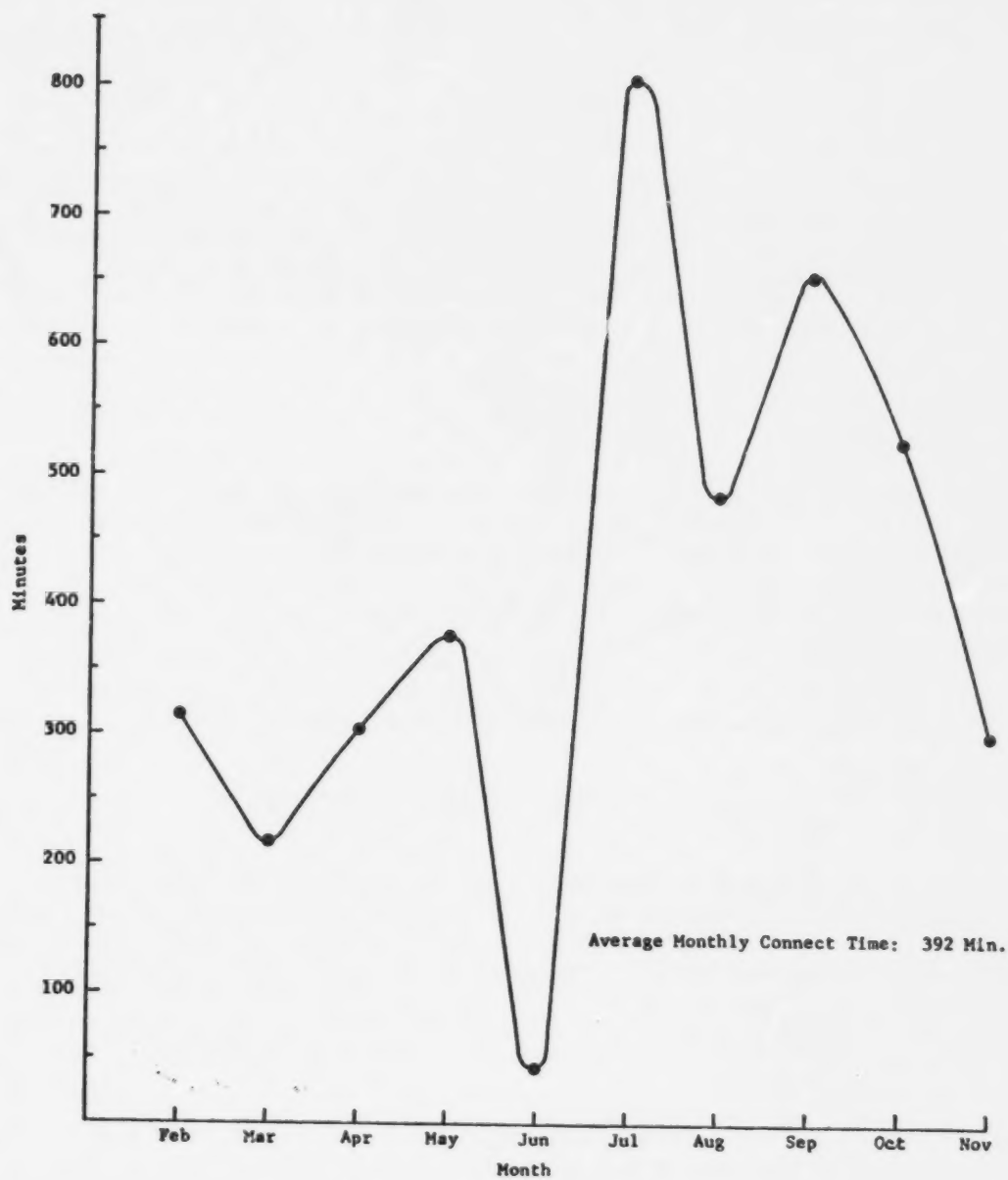


FIGURE 2. MONTHLY REMOTE TERMINAL CONNECT TIME WITH THE AMIC ON-LINE INTERACTIVE INFORMATION BASE

Since it was not anticipated that the information base would be available to a wide range of users, funds for training users were not provided in the contract. The only alternative was, as previously mentioned, to provide User Guides and assistance via telephone.

Vocabulary List

To assist the users in searching the information base, the complete vocabulary of the information base was distributed to the facilities having access to the system. A list printed in August contained about 14,400 terms and showed the number of documents indexed by each term. Sample pages are shown in Figure 3. The list was also used by the indexers as an aid to maintaining consistency in the vocabulary.

FTS Lines

Because Federal laboratories generally use FTS (Federal Telecommunication System) lines for making telephone calls, it was felt that accessing the computer would be facilitated by having a direct FTS tie line to the computer. This capability would eliminate the necessity of asking the Columbus FTS operator to dial the Battelle computer number. Direct access to the Battelle computer via FTS lines was investigated and found to be technically feasible. It is quite possible that this capability will be added to the Battelle system in the near future. Other possibilities such as toll-free lines will also be considered.

Transfer of BASIS-70 File to ENVIRON

One program outstanding in the EPA in 1972 was completion of a contractual agreement for an EPA-wide, on-line interactive computer system. The purpose of the system was to provide a centralized system which would be well known throughout the EPA community, provide the economics of scale, and be managed by one EPA office. The system chosen was ENVIRON (Environmental Information On-Line). It is not the purpose of the present report to describe this system but rather to discuss the implications for the AMIC as operated by Battelle.

Plans to transfer the AMIC computer file to EPA's ENVIRON system were discussed at RID and the Data Systems Branch at EPA Headquarters. However, demands of maintaining other information bases on ENVIRON caused indefinite postponement of this transfer.

24	AMPHIPCCA
2	AMPHIPCCRA
1	AMPHIPCCRA ALATA
1	AMPHIPCCRA PELUDOSA
3	AMPHIPSYCHE
1	AMPHIPSYCHE PROLUTA
2	AMPHIPSYCHE SCOTTAE
2	AMPHIRCA
1	AMPHIROA BRASILIANA
1	AMPHIROA FRAGILISSIMA
1	AMPHISOLENTIA CLOSTRIFERA
1	AMPHIURIDAE
1	AMPHIURIDS
11	AMPHICRA
1	AMPHORA DECUSSATA
3	AMPHORA OVALIS
1	AMPHORA OVALIS VAR. PETICULUS
1	AMPHORA SPP
2	AMPHORA VENETA
1	AMPITHOE
1	AMPITHOE RUBRICATA
1	AMYGDALIN
2	AMYL ACETATE
1	AMYL ALCOHOL
1	AMYL MERCURY
1	AMYLCE
16	ANACAENA
2	ANACAENA CIRCINALIS
1	ANACAENA CONSTRICTA
4	ANACAENA CYLINDRICA
2	ANACAENA FLCS-AQUAE
1	ANACAENA SPIROIDES
2	ANACAENA SPP
1	ANACAENOPSIS
1	ANACAENOPSIS CIRCULARIS
1	ANAEENO
1	ANABCLIA FURCATA
1	ANABCLIA NEPVCCA
1	ANACAENA
1	ANACAENA LIMBATA
1	ANACOSTA RIVER
4	ANACYSTIS
2	ANACYSTIS CYAREA
3	ANACYSTIS MIDULANS
1	ANACYOMENE
1	ANACYOMENE STELLATA
23	ANAEROBIC BACTERIA
8	ANAEROBIC CONDITIONS
5	ANAEROBIC DIGESTION
5	ANALOG COMPUTER
11	ANALYSIS OF VARIANCE
750	ANALYTICAL TECHNIQUES
1	ANAPHICHA LUPUS

FIGURE 3. SAMPLE PAGE FROM THE AMIC VOCABULARY LIST

SECTION IX

CHEMICAL EFFECTS DATA

During the course of the contract, a grant (Grant No. R 800 942) was awarded to Battelle by the Division of Processes and Effects, Ecological Effects Branch of EPA entitled "Data Treatment - Chemical Effects on Aquatic Life" which involves the addition of data from the report "The Effect of Chemicals on Aquatic Life" (Ref. 2) to the AMIC information base. The addition of these data to the information base required extensive modification of the computer programming, but added a valuable dimension to the base. As shown in the sample display (Figure 4), this portion of the program provided the capability for storing the actual data on toxic effects of chemicals on aquatic organisms.

Table 8 presents the abbreviations used in presenting the chemical effects data. Thus, the first data point in Figure 4 may be interpreted as follows:

Heptachlor	Toxicant
Brachionus	Organism studied
BSA	Type of test (bioassay, static, acute)
--	Location (if a field test)
0.1 (NTE)	Dosage (ppm) and result (no toxic effect)
a,c,d,e,f	Variables controlled or noted (water temperature, pH, alkalinity, dissolved oxygen, hardness)
KONAR (1970)	Author and year of publication
Plankton, Pesticides, Insecticides, Chlori- nated hydrocarbon pesticides	Added index terms.

Preparation of the chemical effects data involved indexing and machining which are described in more detail in the following paragraphs. To differentiate between chemical effects data and literature searches, the chemical effects search terms were prefixed by "CE". Consequently, searches were made by prefixing the terms likewise. All the capabilities of the system that were available with the literature base were also available with the chemical effects data base.

ENTER YOUR SEARCH ONE TERM AT A TIME.

1/ CE PLANKTON
13 ITEMS

2/ CE ZOOPLANKTON
3 ITEMS

3/ CE HEPTACHLOR
30 ITEMS

4/ CE HEXADECANOL
6 ITEMS

5/ CE CHLORAMINE
2 ITEMS

6/ (1 OR 2 AND 3 OR 4 OR 5)
14 ITEMS

ENTER YOUR REQUEST

7/ DISPLAY

THE DATA ELEMENTS FOR THE AMIC DATA BASE ARE

1-ACCESSION NUMBER,
2-FACILITY,
3-TITLE,
4-AUTHOR(S),
5-BIBLIOGRAPHIC DATA,
6-INDEX TERMS,
7-ABSTRACT.
8-CHEMICAL EFFECTS.

WHAT FIELDS DO YOU WANT TO SEE?

ENTER FIELD NUMBERS SEPARATED BY COMMAS OR ALL

/ 8

THIS PRINTOUT COULD BE LENGTHY.

HOW MANY DO YOU WANT TO SEE FIRST?

/ 14

ITEMS FROM THE AMIC DATA BASE ARE

HEPTACHLOR/ BRACHIONUS/ BSA/ --/ 0.1 (NTE)/ A,C,D,E
,F/ KONAR (1970), AMIC-448/ PLANKTON, PE
STICIDES, INSECTICIDES, CHLORINATED HYDR
ROCARBON PESTICIDES/

HEPTACHLOR/ CERIODAPHNIA/ BSA/ --/ 0.1 (K)/ A,C,D,
E,F/ KONAR (1970), AMIC-448/ PLANKTON, P
ESTICIDES, INSECTICIDES, CHLORINATED HYD
ROCARBON PESTICIDES?

HEPTACHLOR/ CLOSTERIUM/ BSA/ --/ 0.001 (K)/ A,C,D,
E,F/ KONAR (1970), AMIC-448/ PLANKTON, P
ESTICIDES, INSECTICIDES, CHLORINATED HYD
ROCARBON PESTICIDES/

HEPTACHLOR/ CYCLOPS/ BSA/ --/ 0.1 (K)/ A,C,D,E,F/
KONAR (1970), AMIC-448/ PLANKTON, PESTIC
IDES, INSECTICIDES, CHLORINATED HYDROCAR
BON PESTICIDES/

HEPTACHLOR/ CYPRIS/ BSA/ --/ 0.1 (K)/ A,C,D,E,F/ K
ONAR (1970), AMIC-448/ PLANKTON, PESTICI
DES, INSECTICIDES, CHLORINATED HYDROCARB
ON PESTICIDES/

FIGURE 4. SAMPLE CHEMICAL EFFECTS DISPLAY

HEPTACHLOR/ DAPHNIA/ BSA/ --/ 0.1 (K)/ A,C,D,E,F/
 KONAR (1970), AMIC-448/ PLANKTON, PESTI
 CIDES, INSECTICIDES, CHLORINATED HYDROCAR
 BON PESTICIDES/
 HEPTACHLOR/ DIAPTOMUS/ BSA/ --/ 0.1 (K)/ A,C,D,E,F/
 / KONAR (1970), AMIC-448/ PLANKTON, PESTI
 CIDES, INSECTICIDES, CHLORINATED HYDROCAR
 BON PESTICIDES/
 HEPTACHLOR/ GASTROTRICHA/ BSA/ --/ 0.1 (NTE)/ A,C,
 D,E,F/ KONAR (1970), AMIC-448/ PLANKTON,
 PESTICIDES, INSECTICIDES, CHLORINATED HY
 DROCARBON PESTICIDES/
 HEPTACHLOR/ NAUPLIUS/ BSA/ --/ 0.1 (K)/ A,C,D,E,F/
 KONAR (1970), AMIC-448/ PLANKTON, PESTI
 CIDES, INSECTICIDES, CHLORINATED HYDROCAR
 BON PESTICIDES/
 HEPTACHLOR/ PANDORIA/ BSA/ --/ 0.001 (K)/ A,C,D,E,
 F/ KONAR (1970), AMIC-448/ PLANKTON, PES
 TICIDES, INSECTICIDES, CHLORINATED HYDRO
 CARBON PESTICIDES/
 HEPTACHLOR/ VOLVOX/ BSA/ --/ 0100. (K)/ A,C,D,E,F/
 KONAR (1970), AMIC-448/ PLANKTON, PESTI
 CIDES, INSECTICIDES, CHLORINATED HYDROCAR
 BON PESTICIDES/

 AMIC-3079/ HEXADECANOL (PRAPARAT ALFOL WV 10)/ CO
 PEPODS/ BSA/ --/ (NTE)/ --/ MANN (1971),
 AMIC-3079/ ZOOPLANKTON, AQUATIC LIFE, AQ
 UATIC ANIMALS, MARINE ANIMALS, ALCOHOLS,
 INSECTICIDES, PESTICIDES, ORGANIC COMPO
 UNDS, BIOASSAY, TOXICITY, CRUSTACEANS/
 HEXADECANOL (PRAPARAT ALFOL WV 10)/ DAPHNIA/ BSA/
 --/ (NTE)/ --/ MANN (1971), AMIC-3079/ Z
 OOPANKTON, WATERFLEAS, PLANKTON, AQUATI
 C ALCOHOLS, INSECTICIDES, PESTICIDES, OR
 GANIC COMPOUNDS, BIOASSAY, TOXICITY, CRU
 STACEANS/
 CHLORAMINE/ DAPHNIA MAGNA/ BCF/ --/ 0.001 (K3-5)/
 A,C,D,E,F,R,S/ ARTHUR AND EATON (1971)
 , AMIC-3290/ DAPHNIA, WATERFLEAS, PLANK
 TON, ZOOPLANKTON, CRUSTACEANS, AQUATIC L
 IFE, AQUATIC ANIMALS, MARINE ANIMALS, OR
 GANIC COMPOUNDS, CHLORINE, HALOGENS, AMI
 NES, TOXICITY, BIOASSAY, ANESEPTIC/

FIGURE 4. SAMPLE CHEMICAL EFFECTS DISPLAY (Continued)

TABLE 8. ABBREVIATIONS USED FOR CHEMICAL EFFECTS DATA

Note: Names of chemicals and organisms are as given by the various authors. Readers should search for alternate, common, and/or scientific names of both chemical and aquatic species; and refer to report section on Extracted Data for further discussion of this appendix.

Footnotes for Appendices A and B:

(1) Letters represent:

B = bioassay, used in combination with S = static, CF = continuous flow, A = acute, and CH = chronic.

L = laboratory bioassay.

BOD = biochemical oxygen demand.

F = field study, used in combination with R = river, stream, creek, etc., L = lake or pond, M = marine, E = estuarine, and O = other (port facility, flooded area, etc.).

(2) Field location is indicated by abbreviation of the state or country.

(3) The number indicates ppm (mg/l), unless otherwise indicated by appropriate designations or (O). The letters within parentheses following indicate T = TL_m, K = kill, SB = sublethal effects, NTE = no toxic effect, or O = other. The number following these indicates the time in days at which observations were made. EC50, LC50, and similar designations for 50 percent lethality were all considered as TL_m and designated as such. The numbers within parentheses following these designations indicate the time in days when the effect was observed.

(4) The following indicate (when underlined the variable was controlled):

a = water temperature

b = ambient air temperature

c = pH

d = alkalinity (total, phenolphthalein or caustic)

e = dissolved oxygen

f = hardness (total, carbonate, Mg, or CaO)

g = turbidity

h = oxidation-reduction potential

i = chloride as Cl

j = BOD, 5 day; (J) = BOD, short-term

k = COD

l = nitrogen (as NO₂ or NO₃)

m = ammonia nitrogen as NH₃

n = phosphate (total, ortho-, or poly)

o = solids (total, fixed, volatile, or suspended)

p = CO₂

Data Preparation

The addition of the chemical effects data to the AMIC literature base required development of a data machining format which would be compatible with the format used for regular information processing, and required some major revisions in the computer program for adding the data to the information base. The format and computer program developed permitted adding abstracts or unabstracted documents with or without chemical effects data.

SECTION X

VOCABULARY CONTROL

On the basis of a recommendation made during the FY-71 study, funds were allocated to study methods of improving indexing and vocabulary control. The purpose of the study was to: (1) incorporate into the AMIC vocabulary broad generic terms commonly used by the AQCL staff and other EPA research personnel, (2) eliminate synonymous terms, (3) eliminate inconsistencies in indexing, and (4) suggest methods for minimizing inconsistencies in the future. These inconsistencies consist of use of acronyms, singular and plural word forms, and synonymous terms. It should be emphasized that this study was not aimed at developing a thesaurus. As stated in the initial contract, the Center has relied upon the Water Resources Thesaurus (Volume 2) as the basis for determining hierarchical relationships. However, this thesaurus has proved to be deficient in many areas of interest to AMIC and was grossly inadequate for use in indexing reports for AMIC.

Because of the rapid growth of the AMIC vocabulary (6400 to 14,400 terms in 8 months), a large portion of the effort was concerned with identifying and correcting inconsistencies and adding broad generic terms. Some of the specific broad terms added for AQCL purposes are shown in Table 9. Samples of synonymous terms eliminated are listed in Table 10. In addition approximately 1822 terms were eliminated or modified. Although it was not possible to incorporate any automated methods in the vocabulary processing, a method was developed on another project at Battelle which should prove useful in the future for AMIC. This development incorporated the idea of establishing equivalencies, for example, Lepomis macrochirus is equivalent to Bluegills, Bluegill, and Bluegill Sunfish. The effect of establishing equivalencies is that when one searches by a term, all equivalencies are also retrieved so that searching of the system is less rigid, permitting one to use singulars, plurals, scientific, or common names depending on how the equivalencies are established.

One problem which arises with using equivalencies such as COD is that it is an ambiguous term. COD may mean chemical oxygen demand or it may mean cod fish. These problems arise in some cases because of the lack of upper and lower case letters on some computer systems. The BASIS system has a capability available for handling these situations. When an ambiguous search term such as COD is entered, the computer responds with:

DO YOU MEAN 1. COD - CHEMICAL OXYGEN DEMAND?
2. COD - COD (FISH)?
ENTER THE NUMBER OF THE DESIRED TERM.

The addition of this capability would essentially eliminate the confusion resulting from ambiguous terms and should be added to the AMIC information base during FY-74.

TABLE 9. SAMPLE BROAD TERMS USED FOR THE ANALYTICAL QUALITY CONTROL LABORATORY

Sample Broad Terms
Alcohols
Solvents
Organic solvents
Macroinvertebrates
Chlorinated hydrocarbons
Mercaptans

TABLE 10. SAMPLE SYNONOMOUS OR NEARLY SYNONOMOUS TERMS IN THE AMIC VOCABULARY

Alkaline earth elements	Alkaline earth metals
Absorption	Uptake, Bioaccumulation, Biological magnification
Biotransformation	Biological transformation
Blackfly	Blackflies
Lethal dosage	Lethal limit
Nitrilotriacetic acid	Nitrilotriacetate, NTA
Oil	Petroleum
Salmo gairdneri	Rainbow trout
EH	Oxidation reduction potential

The most critical requirement for the AMIC vocabulary list is automatic generic posting. This capability is also available on BASIS-70. However, application of automatic hierarchical posting requires that generic relationships first be established. The development of a thesaurus is a major project. Sufficient funds were not available to develop a thesaurus for AMIC. An alternative to full-scale thesaurus development would be limited development in selected areas. This could be based upon the Water Resources Thesaurus (Volume 2) coupled with the expertise of the Center's staff. A number of important areas have been identified which would benefit from automatic generic posting. A number of examples are included in Table 11.

It is recommended that at least limited thesaurus work be done during continued operation to provide automatic generic posting in selected areas.

TABLE 11. SAMPLE BROAD AREAS FOR THESAURUS DEVELOPMENT

Plankton
Periphyton
Drift organisms
Macroinvertebrates
Fish
Algae
Metals
Analytical techniques (including specific types of analysis)
Pesticides
Nutrients
Bacteria
Chemical compounds
Industrial wastes
Chlorinated hydrocarbons

SECTION XI

QUICK RESPONSE INQUIRY SERVICES

One of the most important services provided for the EPA was the Quick Response Inquiry (QRI) service. The QRI service was established as a means of responding to specific inquiries from EPA staff.

It was anticipated that the QRI service would be offered primarily to the AQCL and to the Headquarters staff of the Measurements and Instrumentation Branch, Division of Processes and Effects. However, changes in the needs of the Branch staff essentially eliminated their use of the QRI service. As a result, the service was made available to other EPA facilities. Announcements of QRI's stimulated interest in the service at a number of facilities with the result that requests for QRI's were received from various laboratories. As was done previously, all requests were directed to the Project Officer for approval prior to starting work. The Project Officer also required that QRI's be requested in writing. So that the AMIC staff would receive adequate information on each request. These requests also ensured that the Project Officer and the AMIC staff had a record of each request for future reference.

As shown in the list of QRI's prepared during the current contract year (Table 12), 13 different facilities made use of the QRI service. It is also obvious from the titles that a wide range of topics was covered. As stated previously, these requests many times signal areas of interest throughout EPA. Consequently, these areas are carefully observed by the AMIC staff as potential additions to the scope. It is noteworthy that two QRI's were concerned with air pollution (QRI- 14 and 22).

In some cases, there was very little literature available on a subject. Under these circumstances, it was necessary to identify and contact researchers who were working in the area of interest. These persons were identified by contacting the Battelle and the AQCL staffs and by initiating searches of the Smithsonian Science Information Exchange (SSIE). Since the SSIE is described on page 57 it will not be discussed at this time. However, persons identified through these sources were often contacted to provide input to the QRI's. Table 13 lists the QRI's which included contact of researchers.

One of the values of the QRI's is that the response time can be adjusted to suit the requirements of the requester. The standard procedure for preparing QRI's was to contact the requester by telephone to make sure "what" was needed, and "when". For an example of "what", in several instances the requester desired a quick evaluation of the state of the art (as in QRI-14) or a condensed summary of the literature (as in QRI-20).

TABLE 12. QUICK RESPONSE INQUIRY LIST

ANALYTICAL METHODOLOGY INFORMATION CENTER

Quick Response Inquiries

QRI NO.	TITLE	REQUESTED BY	DATE REQUESTED	ANSWERED BY	DATE ANSWERED
13	Analytical Methods for Diethylstilbestrol	Ballinger (AQCL)/ Walter (Region VII Laboratory)	12/13/71	Warner	1/26/72
14	Use of Semi-Conductor Materials for Monitoring Air Pollution	Reznek (Hqtrs.)	12/15/71	Kircher	1/7/72
15	Toxicity of Chromium to Aquatic Life (Literature Survey)	Pickering (Newtown Fish Toxicology Lab.)	1/29/72	McCann	2/15/72
16	Analytical Methods for Bacteria in Chlorinated Wastewater and Sediments (Literature Survey)	Greene (AQCL)	4/14/72	Holoman	2/24/72
17	Significance of <i>Klebsiella</i> Organisms in the Environment	Bordner (AQCL)	2/14/72	Anderson	3/16/72
18	Methods for Determining Biochemical Oxygen Demand	Kroner (AQCL)	2/3/72	Holoman	3/21/72
19	Gas Chromatographic Determination of Petroleum in Water Using FID, FPD, Electron Capture and Thermionic Detectors (Literature Survey)	Kawahara (AQCL)	3/8/72	Byrd	3/16/72
20	Analysis of Recent Literature on Biotransformation of Arsenic, Cadmium, Copper, Lead, Selenium, and Thallium	Kroner (AQCL)	4/5/72	Kozmaier	5/16/72
21	Heavy Metal Characterization of Sewage Plant Influenta and Effluents	Clough (NEPC) Cincinnati	4/4/72	Wilson Little	5/12/72

TABLE 12. QUICK RESPONSE INQUIRY LIST (Continued)

QRI NO.	TITLE	REQUESTED BY	DATE REQUESTED	ANSWERED BY	DATE ANSWERED
22	Resonance Fluorescence of Active Gas-Phase Atomic Hydrogen, Oxygen, and Halogens, and Molecular OH, CO, and NO (Literature Survey)	Harrison (RTP)	6/2/72	Byrd	6/26/72
23	<u>E. Coli</u> as a Pollution Indicator	Bordner (AQCL)	6/6/72	Holoman	8/24/72
24	Characterization of Effluents From Pharmaceutical Industries	Seba (NFIC-Denver)	6/5/72	Little/Holoman/Byrd	8/1/72
25	Unattended Samplers of Dissolved Organics	Seba (NFIC-Denver)	6/5/72	Pestel	9/6/72
26	Bioassay and Biomonitoring of Water Pollutants	Seba (NFIC-Denver)	6/5/72	Kemp/Holoman	10/10/72
27	Toxicity of Furfural, Heptachlor, and Heptachlor Epoxide	Seba (NFIC-Denver)	6/5/72	Little/Pestel	6/22/72
28	Infrared Analysis of Petroleum Products	Karabara (AQCL)	6/8/72	Byrd	6/20/72
29	Methods for Extraction, Characterization, Isolation and Identification of Naturally Occurring Organic Materials in Water (Literature Survey)	Lichtenberg (AQCL)	6/8/72	Pestel/Byrd	7/3/72
30	Methods for Preconcentration for Analysis of Trace Metals in Marine Samples (Literature Survey)	Feldman (NERC-Corvallis)	6/15/72	Long/Mackin	7/19/72
31	Analysis of Heavy Metals in Seawater by Atomic Absorption (Literature Survey)	Seba (NFIC-Denver)	6/23/72	Long/Mackin	7/21/72

TABLE 12. QUICK RESPONSE INQUIRY LIST (Continued)

QRI NO.	TITLE	REQUESTED BY	DATE REQUESTED	ANSWERED BY	DATE ANSWERED
32	Effects of Chromium on Sewage Treatment and the Effects of Sewage Treatment on Chromium	Seba (NFIC-Denver)	7/10/72	Pestel/Byrd	8/25/72
33	Analysis of Precipitation for Trace Elements (Literature Survey)	Winter/Stanley	7/11/72	Byrd	8/11/72
34	Slaughterhouse and Granary Wastes (Literature Survey)	Bernard (Off. of Research)	7/7/72	Sprague	8/9/72
35	Biodegradation of Cyanide Wastes (Literature Survey)	Jones	7/13/72	Sprague/Little	7/24/72
36	Biological Transformation of Lead in Oil	Guarria (Virginia)	7/7/72	Byrd	8/23/72
37	Methods of Characterization and Analysis of Bottom Sediments and Deposits (Literature Survey)	Kroner (AQCL)	8/2/72	Byrd	9/18/72
38	Identification, Analysis and Effects of Organic Compounds in Kraft Paper Mill Wastes (Literature Survey)	Keith (Southeast Water Laboratory)	8/16/72	Pestel/Little	10/2/72
39	Identification of Wood Materials in Water and Sediment (Literature Survey)	Rosen (NFIC-Cinn.)	8/17/72	Pestel/Byrd	10/9/72
40	Analytical Methods and Biological Effects of Thallium and Tin (Literature Survey)	Gile (NRC-NTP)	8/24/72	Byrd	9/15/72
41	AMIC Vocabulary List	Weber (AQCL)	9/9/72	Pestel	10/17/72

TABLE 12. QUICK RESPONSE INQUIRY LIST (Continued)

QRI NO.	TITLE	REQUESTED BY	DATE REQUESTED	ANSWERED BY	DATE ANSWERED
42	Role of Microorganisms in the Transformation or Transport of Pesticides in Water (Literature Survey)	Weber (AQCL)	9/7/72	Byrd	10/6/72
43	Effects of Dye Compounds in Domestic Wastes	Forziati (Hdqtrs.)	9/28/72	Holoman	10/30/72

TABLE 13. QRI'S IN WHICH OUTSIDE RESEARCHERS WERE CONTACTED

QRI No.	Title
20	Analysis of Recent Literature on Biotransformation of Arsenic, Cadmium, Copper, Lead, Selenium, and Thallium
22	Resonance Fluorescence of Active Gas-Phase Atomic Hydrogen, Oxygen, and Halogens, and Molecular OH, CO, and NO (Literature Survey)
23	<u>E. Coli</u> as a Pollution Indicator
24	Characterization of Effluents From Pharmaceutical Industries
25	Unattended Samplers of Dissolved Organics
26	Bioassay and Biomonitoring of Water Pollutants
30	Methods for Preconcentration for Analysis of Trace Metals in Marine Samples (Literature Survey)
31	Analysis of Heavy Metals in Seawater by Atomic Absorption (Literature Survey)
32	Effects of Chromium on Sewage Treatment and the Effects of Sewage Treatment on Chromium
33	Analysis of Precipitation for Trace Elements (Literature Survey)
34	Slaughterhouse and Granary Wastes (Literature Survey)
36	Biological Transformation of Lead in Oil
40	Analytical Methods and Biological Effects of Thallium and Tin (Literature Survey)
43	Effects of Dye Compounds in Domestic Wastes

The amount of time that elapses between the receipt of the requests and the date of the completed QRI document is not necessarily the actual response time. If an immediate answer was needed, the requester was provided an intermediate response. Various approaches were used or are available for use, such as telephoning references, shipping copies of articles on a daily basis as they were identified, or making weekly shipments. The use of various facsimile transmitting devices, if they are available and compatible, is also possible though this mechanism was not used during the FY-73 contract. The point is that a center such as AMIC should maintain complete flexibility in order to meet the needs of the requester as expeditiously as possible.

Copies of QRI's

Since the topics of the QRI's seemed to be of interest to persons other than the requesters, it was considered advisable to make copies available upon request. Consequently, flyers were included with the March-August issues of the "Reviews" listing the titles of the QRI's and announcing their availability. A large number of requests for copies were received as shown in Table 14. The numbers of requests for certain QRI's served as a barometer of EPA interests in specific topic areas. Several facilities which found the QRI's to be especially useful requested that all QRI's be sent to them upon completion. Copies of all QRI's were sent to the Project Officer and certain EPA managers.

After several months, the cost of providing copies of QRI's became too large to cover with the contract funds. An alternate method was set up in which the Battelle library agreed to make copies at a cost of 10 cents per page with a minimum of \$3.00. Although the number of requests dropped off when copies were no longer free, several facilities purchased copies. On one occasion, loan copies of several QRI's were mailed to an EPA laboratory so they could make their own copies. It should be noted that the reduction in requests did not altogether result from adding a charge for copies. When funds were no longer available to provide the service, no further announcements were included in the "Reviews". In addition, many facilities find it difficult to purchase low cost items. In some cases, it appeared that funds were not available to cover these costs.

Although it proved to be expensive for the Center to provide copies of QRI's they were a sound investment. If a QRI is prepared at a cost of \$500 and given to one researcher, the cost for responding to his request is \$500. However, if the QRI proves to be of interest and useful to two other persons and copies are given to them, the cost per response, including the cost of copying, would be about \$170. If it is accepted that a basic goal of information management is to get useful information to many persons as cheaply as possible, then the logical conclusion would be that the Center should provide copies when they are needed.

TABLE 14. QRI'S SENT TO REQUESTERS

QRI No.*	No. of Copies
1	21
8	20
10	15
12	27
12A	27
13	11
14	13
15	26
16	17
17	21
18	25
19	18
20	25
21	22
22	8
23	9
24	13
25	8
**26	5
27	11
28	11
29	18
30	17
31	12
32	7
33	9
34	11
35	9
36	8
37	6
38	5
39	5
40	5
41	11
42	4
43	4
Total	<u>484</u>

* Copies of QRI's prepared during the design study (Nos. 1-12A) were also supplied by the Center.

** Four additional copies were requested but were not sent out.

Reactions to the QRI's

Based on the demand for copies of QRI's and the reactions by the recipients, the QRI service has appeared to be one of the most valuable services offered by the Center. Out of a total of 30 QRI's prepared by the Center during the current contract, nine of the recipients provided written comments. These are included in Appendix E. Additional comments were received during telephone conversations. Most reactions, both written or oral, were favorable. The one or two unfavorable reactions resulted from misunderstandings about the topics to be covered or the type of product to be provided.

Costs of QRI's

Many of the QRI's involved extensive literature searching, making personal contacts, and various levels of analysis. Consequently, the costs of preparing requests covered a wide range, from \$132 to \$1823. The average cost per QRI was \$743, and the median cost was \$656. This average cost, when compared to the estimated average of \$500 per response is indicative of the more sophisticated nature of the QRI's. This trend has been observed in other Centers at Battelle. It is still possible to provide responses in the \$500-\$600 cost range, however, in many cases these will not completely satisfy the requester. Consequently, the EPA managers of the Center will have to decide whether best-effort responses will be provided at a fixed costs or whether responses of the type desired, within reasonable costs will be provided.

Since the experience of the Center has shown that the QRI service is useful to a broad spectrum of EPA facilities, an alternative method for funding QRI's is suggested as follows. A basic QRI fund would be included in the contract to cover the cost of QRI's requested by the main users of the Center, namely the AQCL and Headquarters staff. Other facilities desiring QRI service could establish separate accounts to cover the cost of their own QRI's. This type of arrangement was established with the National Field Investigations Center (NFIC) at Denver. At the end of the contract, when QRI funds were no longer available, the NFIC provided funds for the AMIC staff to do an extensive literature survey on sampling for bacteriological analysis. The advantages of this type of arrangement would be that each facility would likely be more selective in using the QRI service if it were covering the costs. Probably more important from the overall program view, a wider number of laboratories would be fiscally involved in the program and would be more inclined to suggest directions for operations as well as provide backing for continued operation. These considerations become very important as the Center begins to appeal to a large number of EPA laboratories including those in environmental areas in addition to the aquatic.

Informal Inquiries

In addition to the QRI's prepared by the Center, several responses were prepared to minor inquiries involving relatively little cost (informal inquiries). The topics of these inquiries were as follows:

1. Acid mine drainage, mercury in the environment, and biological oxidation of iron and sulfides,
2. Toxicity, and Chemical analysis, of water pollutants,
3. Slaughterhouse wastes (later became a QRI).

Although the costs of preparing these responses was not covered by the QRI funds, comparison of both types of inquiries demonstrates a common trend in QRI services. On the one hand, inquiries tend to become more and more complex, whereas on the other hand, some inquiries become very simple and can be answered at low cost.

SECTION XII

SMITHSONIAN SCIENCE INFORMATION EXCHANGE (SSIE)

The Smithsonian Science Information Exchange, which is basically a service for identifying on-going scientific research, was anticipated in the FY-71 study to be useful to the AQCL (and other EPA facilities). Although no occasion arose for using the service during the FY-71 study, it was suggested that the Center serve as intermediate between the SSIE and EPA facilities.

To further investigate SSIE's facilities and services, an AMIC staff member visited that office in January, 1972. The visit provided insight into SSIE's operations and products which better prepared the Center's staff to anticipate ways of using the service.

As stated in the section entitled "Quick Response Inquiries", a number of the requests for QRI's required state-of-the-art information. Since the secondary literature tends to lag the "state-of-the-art" by about two years (Ref. 3), alternative information sources had to be identified, namely persons actually doing research in the areas of interest. Both the AQCL and Battelle technical staffs were able to provide some leads; however, SSIE searches proved to be very useful on these occasions. When it became apparent during the preparation of a QRI that the literature would not provide sufficient information, the AMIC staff would request a search by the SSIE. (See sample notification, Figure 5.) The search results would then be reviewed by the AMIC staff, impertinent portions removed, and pertinent portions included in the prepared QRI. When the requester of the QRI needed information other than references, the AMIC staff contacted some of the researchers who often provided valuable information and/or leads to other researchers. The final QRI included the results of these contacts which often proved to be the most important part of the response.

The SSIE searches requested by the AMIC are listed below and demonstrate the types of subjects which the Center dealt with which were state-of-the-art technology.

1. Occurrence and methods for analysis, extraction, characterization, and identification of polychlorinated biphenyls (PCB) and/or naturally occurring organic materials in water (naturally occurring organic materials include among others, organic acids, natural phenols, lignins, humic acids and alpha-conidendrin).
2. Biological or microbiological transformation, accumulation, absorption, or uptake of heavy metals and trace elements (Lead, copper, mercury, zinc, arsenic, boron, selenium, cadmium, nickel, chromium, antimony, cobalt, molybdenum, etc.) in seawater or freshwater.

SMITHSONIAN
SCIENCE INFORMATION EXCHANGE, INC.
1730 M STREET, N.W. PHONE 202-381-5511
WASHINGTON, D.C. 20036

SIE NO.

AK-120

NOTICE OF RESEARCH PROJECT

SUPPORTING AGENCY:		AGENCY'S NUMBER(S):	
HEALTH, EDUCATION & WELFARE PUBLIC HEALTH SERVICE HEALTH SER. MNTL. HLTH. ADMIN. NATL. INS. OCCUP. SAF. & HLTH.		433-312-01	
TITLE OF PROJECT:			
DEVELOPMENT OF ANALYTICAL METHODS - INORGANIC			
PRINCIPAL INVESTIGATOR, ASSOCIATES AND DEPARTMENT/SPECIALTY:			
JR CARLBERG		PHYSICAL & CHEM ANALYSIS BP	
RECIPIENT INSTITUTION:		PERIOD FOR THIS NRP:	
U.S. DEPT. OF HLTH. ED. & WEL. P.H.S. HLTH. SERV. & M.H. ADM. 1014 BROADWAY CINCINNATI, OHIO 45202		7/71 TO 6/72 FY72	
SUMMARY OF PROJECT:			
The objective of this project is the development, testing, and improvement of standard analytical procedures for hazardous inorganic compounds and elements. Samples of interest include inorganic vapors, fumes and dusts, blood, urine, and biological tissue. A small sampling of the hazardous agents of interest includes lead, silica, asbestos, ammonia, cadmium, fluorides and HF, nitric acid, nitrogen oxides, sulfuric acid, sodium hydroxide, tin, CS₂, chlorine, chromic acid, mercury, platinum, arsenic, and beryllium. Several analytical techniques will be investigated on in-house and on contract bases. These include neutron activation analysis, spark source mass spectrometry, induced electron emission spectrometry, selective ion electrodes, metal ion catalysis, anodic stripping voltammetry, atomic absorption spectrophotometry, emission spectroscopy, x-ray diffraction, infra-red spectrometry, differential thermal analysis, thermal gravimetric analysis, x-ray fluorescence spectrometry, and gas chromatography of metal chelates.			
FIGURE 5. SAMPLE NOTIFICATION OF ON-GOING RESEARCH FROM SSIE			

Reproduced from
best available copy.



3. Analysis of undissolved heavy metals (Including but not limit to: Mercury, chromium, iron, cadmium, zinc, nickel, copper, aluminum, antimony, lead, arsenic, calcium, potassium, magnesium, and sodium) in rainwater (also check atmospheric precipitation; rainfall; and natural waters, rain).
4. Identification of wood materials in water, mud, and sediment.
5. Identification and effects of organic compounds in kraft paper mill wastewaters.
6. Characterization and analysis of stream, lake, and ocean bottoms including sludge beds below industrial outfalls and sewage treatment plant outfalls, industrial gunks and muds, organically covered silts, dredge spoils, and oil covered shore line material. DO NOT INCLUDE characterization of geologic sediments, fluvial sediments or bottom sediments according to particle size or sedimentation rate.
7. Methods for analysis, special handling techniques, toxicity, and pharmacology of thallium and tin, synergistic effects of thallium on tin and tritium (tritiated water) administered orally to rats or small mammals.

In addition, to making customer searches, the SSIE sells copies of searches prepared for other facilities. One particularly pertinent search was purchased and forwarded to AQCL to provide the staff with possible leads for future contact. It is not known whether any of the researchers identified in the search were ever contacted by the AQCL staff.

Because of the nature of some of the inquiries and on the basis of the results obtained, it is concluded that the services of the SSIE are definitely required for the AMIC to provide adequate QRI's on some topics. Therefore, continued provision of QRI services by the Center should incorporate the services of the SSIE when required. There is substantial doubt concerning the value of purchasing SSIE searches prepared for other facilities unless the Center's staff actively promotes use of the searches or maintains them for future reference. Since there is a great deal of uncertainty concerning the value of prepared searches, it is recommended that they not be purchased unless they bear on a known need within the EPA community.

SECTION XIII

SELECTIVE DISSEMINATION OF INFORMATION (SDI) SERVICES

SDI services selectively disseminate large amounts of information by running computer searches of indexed titles on magnetic tapes against prescribed profiles. Since these tapes contain bibliographic citations from a large number of journals (thousands), the Center was assigned the task of evaluating the usefulness of the service as a means of broadening the AMIC screening process to provide coverage of journals not scanned by AMIC.

Toward this end, three profiles were prepared by three AQCL staff as follows:

1. Methods of extracting and measuring chlorophyll and pheophytin
2. Ion selective electrode methods for measurements in water and wastes
3. Methods and techniques for the detection, identification, and enumeration of water pollution indicator organisms

These profiles were sent to three different SDI services covering microbiology, biology, and instrumentation. The output from the services, were mailed weekly to the Center. Evaluation forms were prepared and attached to the weekly outputs which were then mailed to the appropriate staff member at AQCL for evaluation. The forms were then returned to AMIC for analysis. The form, as shown in Figure 7, also allowed the recipient to note any modifications that should be made in his profile to provide more accurate coverage.

The results of the evaluations, which are shown in Table 15, covered periods of 33 to 36 weeks. Assuming that the three SDI services provide reasonably similar coverage for a given topic, it can be concluded that the output is significantly affected by the subject area chosen. For example, total output for Search 2 (Ion selective electrodes) was much less than that for Searches 1 and 3. This is a reasonable result based upon the experience of the AMIC staff. It is interesting to note that even with high output topics (1 and 3), about 20 percent of the time (10 or 11 weeks per year), there were no hits. As can be seen from the samples in Figure 7, the SDI notifications consisted of computer-printed bibliographic citations. Since references alone provide limited information, additional effort is required to obtain substantive information. As Table 15 shows, the evaluators were unable to determine the pertinency of 17 percent of the notifications. Consequently, it would be at least

May 15, 1972

SDI DISSEMINATION

(Note: Return this form only to the Analytical Methodology Information Center, c/o R. L. Little, Battelle-Columbus Laboratories, 505 King Avenue, Columbus, Ohio 43201.)

Requestor Robert H. Bordner Date of Search April 10, 1972

Profile No. 3

PROFILE: Methods and techniques for the detection, identification, and enumeration in water of pollution indicator organisms.

See printout for the keywords used in the search and any terms to be added to or deleted from your profile.

<u>Deletions</u>	<u>Additions</u>
Chlorination; Disinfection; Sewage treatment; Water treatment; Halogens; Chemicals; Water management; Industrial wastes; BOD; Ozone; Calcium compounds; Bromine; Iodine; Hydrogen; Soils; Chemistry	See other sheet

SERVICE: Engineering Index COMPENDEX

<u>Abstract No.</u>	<u>Not Useful</u>	<u>Need More Info.</u>	<u>Useful A Hit!</u>	<u>Include in AMIC</u>
00037			X	
00079			X	
00080			X	
00081			X	
00092			X	
00129			X	
00130			X	
00133			X	
00142			X	
00143			X	
00184	X			
00230			X	
00231			X	
00232			X	X
00233			X	X
00234			X	
00235			X	X
00236			X	
00253			X	
00264			X	
00274			X	X
00276			X	X

Note: Use other side for additional comments.

FIGURE 6. SDI EVALUATION FORM

[illegible]

FIGURE 6. SDI EVALUATION FORM (Continued)

PRCFILE = 016780-C01

FEB. 09, 1973

QUESTION WT. +100

MCCDY GJ, THOMAS JC,

SELECTIVE ION-SENSITIVE ELECTRODES (MERROW TECHNICAL LIBRARY, PRACTICAL SCIENCE)

(80CKA7) 1971, 140 PP.

AVAIL.. 455, (MERROW, WATFORD, ENGL.)

077CC1

KEYWDS. BACK ION SELECTIVE ELECTRODE

CA-CONDENSATES (CHABA8) , 078(04) 023268, ACS COPYRIGHT

PRCFILE = 016780-C01

FEB. 09, 1973

QUESTION WT. +100

PUNGOR E, ICF K,

INST. GEN. ANAL. CHEM., TECH. UNIV., BUDAPEST, HUNG.

ION-SELECTIVE SENSORS

PURE APPL. CHEM. (FACHAS) 1972, 31(4) 521-35

079CC2

KEYWDS. ION SELECTIVE ELECTRODE ANALYSIS PHARMACEUTICAL WATER WASTE

BLOOD URINE

CA-CONDENSATES (CHABA8) , 078(04) 023501, ACS COPYRIGHT

04/10/72

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873 KCD 04/07/72 BATTELLE INSTITUTE-PIGMENT EXTRACTION

72-018125

CODN PHCBA/PHOTOCHEM PHOTOBIOL

BIBL 14 (3). 1971/261-275

AUTH LAVOREL J/

TITL FLUORESCENCE AND LUMINESCENCE STUDIES OF IN-VIVO CHLOROPHYLL WITH A LASER PHOSPHORSCOPE/

KEYW CHLORELLA LIGHT LUMINESCENCE INTENSITY DECAY ELECTROCHEMICAL PHENOMENA POOL NUMBER

CROS 06504 07517 10502-10504 10604-51506*51516-51523-

SYST 51506 13300

FIGURE 7. SAMPLE SDI OUTPUT

ABSTRACT NO. 031182

CA VOL. 76, NO. 07
SECTION 05

PROFILE C1G060051A

JIRIK, V.; POKORNY, J.; CULIKOVA, H. (USTAV HYG., PRAGUE, CZECH).

DEGRADATION OF ORGANOPHOSPHATE INSECTICIDE IN SURFACE WATER.

CESK. HYG. 16(6), 177-82, 1971. (ASTM CODEN: CEHYA). ORIG. LANG.:
CZECH.

INDEX TERMS: \$CA005000\$ BACTERIA SEWAGE MALATHION ORGANOPHOSPHORUS
DEGRDN MICROFLORA

SEARCH TERMS PRESENT: SEWAGE WATER

WEIGHT FOR THIS CITATION: 0

FIGURE 7. SAMPLE SDI OUTPUT (Continued)

TABLE 15. EVALUATION OF SDI SERVICES

Search	Number of Weeks Evaluated	Number of Weeks No Hits	Total Hits ^B	Number Not Useful ^C	Number Indeterminate	Number Useful ^C	Number of Useful Items From Sources Covered by AMIC	Average Useful Hits Per Week	Cost Per Total Hits	Cost Per Useful Hits
1	33	4 ^A (11.8%)	531	268 (50.4%)	146 (27.4%)	117 (22.0%)	17 (14.4%)	3.5	.66	3.00
2	36	10 (36%)	76	53 (69.7%)	12 (15.7%)	9 (11.8%)	3 (33.3%)	.25	6.14	51.88
3	32	4 (12.5%)	530	347 (67%)	42 (7.9%)	141 (26.6%)	35 (25%)	4.4	.57	2.14
Average		20.1%	379	62.3%	17.0%	20.1%	22.1%	2.71		4.19

A. For Search 1, this value was calculated from a 34 week sample.
 B. Total number of citations for the evaluation period.
 C. As determined by AQL evaluators.
 D. Number of documents whose pertinence could not be ascertained from the information provided.

necessary to obtain an abstract to adequately evaluate these items. Even in the case where the pertinency of an item can be determined from the title, it is necessary to expend additional effort to obtain substantive information. In many cases this would likely be the complete article. Since these items likely appear in scattered sources, it no doubt will be necessary to resort to interlibrary loan services to obtain them. If the number of items to be obtained this way is large, quite high costs may be incurred.

The most important results shown in Table 15 are the number of useful items and the cost per useful item. About 20 percent of all items proved to be useful. This appears to be a low rate of accuracy and seems to indicate that the SDI services are not very selective. Modification of two of the profiles did not appear to improve very effectively the accuracy of the output. If the output for a given profile is large, the accuracy becomes very important. If few of the notifications are pertinent, the reviewer will soon question the value of spending his time in this manner. Since he must employ further efforts to obtain substantive information on those items he does find to be of interest, he may resort to another method of identifying information.

The cost per useful item identified by the SDI services as shown in Table 15 ranges from \$2.14 to \$51.88. Although it is impossible to place a value on a particular item of information, it would appear that the cost of \$51.88 for a bibliographic citation is too high. It is quite possible that a more economical approach is available for identifying these items. However, if several profiles are searched by an SDI service, the average cost per item (\$4.19 in Table 15) may be acceptable.

Since the purpose of the present study was to evaluate the usefulness of the SDI services for broadening the coverage of the literature for AMIC, a further analysis was made to determine how many items noted as useful appeared in sources covered by AMIC. The percentages for each profile are shown in Table 15 with an average of 22.1 percent. It can be concluded then that of the items noted as useful, about 78 percent would not have been picked up by AMIC. Therefore, if the Center is to provide optimal coverage of the literature on analytical methods, the SDI services are beneficial in this respect. However, it must be recognized that the services are costly, and involve costs beyond purchase of the service, namely the cost of obtaining further information from the notification. Further, during the first year of AMIC operations, much more valuable information was identified than could be processed within the funds provided. Based on this fact, it would appear that a more logical approach would be to utilize available funds first to process the important items which have been acquired from the core sources and if additional funds are available then acquire the most important items identified by the SDI services.

One further point needs to be considered. This is the fact that the NERC-Cincinnati Library was able to procure two SDI services, one batch mode and one on-line, at a more economical rate than was available to

AMIC because of a larger user audience. If funds are available for AMIC to process additional information, consideration should be given to allowing the Center to access those services procured by the NERC-Cincinnati Library. This would provide better utilization of those services and eliminate that cost to the Center.

In summary, on the basis of these evaluations, the SDI services do not provide very selective output. Therefore, if they are used to broaden the literature coverage of AMIC, it may be necessary to review large numbers of notifications with relatively low return. However, a large percentage (78 percent) of those items selected as useful will be from sources not covered by AMIC. The decision whether or not to use SDI services in conjunction with the regular AMIC acquisitions program will have to be based upon the availability of funds to obtain those items identified. Even if the SDI services procured by the NERC-Cincinnati Library are utilized by AMIC, fairly extensive costs will be incurred not only in obtaining the items but also in processing them into the system.

SECTION XIV

LOAN STUDY

Although the contract called for a study "to determine the most feasible means of providing loan services such as use of microfiche copies, aperture cards, or other document forms", the Project Officer agreed that because of the demand for funds in other areas of operation, the study would not be undertaken. Whether a similar study should be conducted as part of the future operation of the Center should be left to the discretion of the Project Officer.

SECTION XV

TRANSLATIONS

Although funds were set aside to provide limited translation services to the AQCL, there was no occasion to use this service. Consequently, with the Project Officer's approval, funds were reallocated for other use. It is doubtful that translation services will be required to any extent in the future, especially with the development of a new EPA policy regarding translations.

SECTION XVI

INTERACTIONS WITH EPA FACILITIES

As a result of the expansion of the AMIC operation and services, an increased number of EPA facilities began to interact with the Center. Obviously, the relationship with the AQCL has provided the foundation of the AMIC operations. However, a number of other facilities have begun to play an important role in the activities of the Center as described below.

Division of Processes and Effects, Measurements and Instrumentation Branch

The headquarters staff of the Measurements and Instrumentation Branch (MIB) has played an important role in both the prototype and operational AMIC because of its fiscal support and guidance of the program. As the AMIC began full-scale operation, two of the AMIC staff and the Project Officer visited the MIB to discuss the orientation of the Center and the needs of the MIB with respect to the AMIC. The need for AMIC services by MIB was very limited, but because of their role in the AMIC, every attempt was made to keep that facility informed of the activities of the Center.

Research Information Division

The Research Information Division (RID) plays a major role in EPA with regard to interactive information systems and therefore has an inherent interest in the AMIC. Therefore, RID was kept informed of the Center's activities by visits and monthly reports and was given access to the information base. Much of the interaction revolved around the possible transfer of the AMIC computer file to the EPA's ENVIRON system as discussed in the section on the information base page 32. In addition, because of the general interests of the RID in EPA's information activities, the AMIC provided summaries of its interactions with WRSIC and of costs of QRI's. It is anticipated that the RID will play a more important role in directing and supporting the Center in the future.

NERC-Cincinnati Library

Because of the proximity of the NERC-Cincinnati library to AQCL and the complementary nature of its activities to those of the AMIC, interaction developed more or less naturally. The Center provided the NERC library with copies of all QRI's, copies of the "Reviews", access to the information base, and occasional loan and copy service. The Center also occasionally provided assistance by preparing responses to inquiries received by

the NERC library. Two responses, QRI-21 and 30 which are shown in Table 12, were prepared at the request of the NERC library. Likewise, the NERC library assisted the Center by handling some document requests, providing copies of reports and other library services.

It is anticipated that the interactions of the NERC library and the AMIC will continue to grow, possibly to the point where the relationships are formally delineated. As suggested previously, consideration should be given to arranging for the Center to provide copies of all documents to the NERC library. All requests for loan and copy services from AQCL and all other EPA facilities could then be directed to the NERC library.

Other EPA Facilities

By virtue of the QRI services and the interactive information system, a number of other facilities became involved with the Center. Since these facilities are listed in Tables 5 and 8, they are not listed here. However, it should be noted that these facilities have a vested interest in the Center and therefore should be inclined to support it.

SECTION XVII

AMIC PUBLICITY

To inform the EPA community of the existence and operation of the AMIC, an announcement was prepared for the AQCL Newsletter which is distributed to about 6,000 addresses within and outside of EPA. In addition, Battelle's Publication and Public Services Office prepared a news release which was mailed to about 150 newspapers and technical journals. In order to respond to the numerous requests for additional information a descriptive pamphlet was prepared. The pamphlet is shown in Figure 8 and describes as concisely as possible the scope and services of the Center. Copies of the pamphlet were also included with one mailing of the "Reviews" so that a broader spectrum of EPA personnel would be informed of the activities of the Center.

ANALYTICAL METHODOLOGY INFORMATION CENTER



NATIONAL ANALYTICAL METHODS DEVELOPMENT RESEARCH PROGRAM

OFFICE OF RESEARCH AND MONITORING
ENVIRONMENTAL PROTECTION AGENCY



ANALYTICAL METHODOLOGY INFORMATION CENTER

Sponsored by the
ENVIRONMENTAL PROTECTION
AGENCY
Under EPA Contract No. 68-01-0166

The Analytical Methodology Information Center (AMIC) was established to assist the Analytical Quality Control Laboratory (AQCL), Cincinnati, and other segments of the National Analytical Methods Development Research Program in searching the technical literature and identifying, procuring, evaluating, and computerizing relevant information.

AMIC also assists the AQCL in fulfilling its role as a literature center of competence in chemical and biological methods for the identification and measurement of pollutants for the Water Resources Scientific Information Center (WRSIC).

FIGURE 8. AMIC PAMPHLET

CURRENT AWARENESS

AMIC will each month identify, abstract, index, and machine approximately 200 current reports on methods for determining the identity, concentration, and ecological effects of pollutants, and measuring water quality. Other environments may be covered in the future. Subject areas covered by AMIC include biology, chemistry, instrumentation, microbiology, and quality control.

The abstracts are disseminated within the EPA by publication of a monthly current awareness bulletin called "Reviews of Current Literature on Analytical Methodology and Quality Control". The abstracts are printed on card stock in 3 x 5 format so that the recipients may clip and file the references of particular interest to them. Copies of the "Reviews" will be available to the public through the National Technical Information Service. Copies of abstracts of reports dealing with water are also forwarded to WRSIC.

COMPUTERIZED DATA BASE

The processed information is stored in a computerized data base which can be accessed via remote terminals. The system operates in a conversational mode which simplifies the searching process and provides immediate (real-time) responses to the users' queries. Retrievals can also be printed "off-line" at AMIC if too lengthy to be printed at the terminal. Access is currently limited to Teletype-compatible terminals. Changes now under way will permit the system to accommodate most other terminals in the near future.

The AMIC computerized data base is currently available from 9:30 a.m. to 12:00 p.m. weekdays, and 9:30 a.m. to 5:00 p.m. on Saturdays, and is updated monthly.

FIGURE 8. AMIC PAMPHLET (CONTINUED)

QUICK RESPONSE INQUIRIES

"Quick Response Inquiry" (QRI) is Battelle nomenclature for a rapid response to an urgent request for services beyond the ordinary scope of AMIC operations. A QRI may consist of preparation of a state-of-the-art report or an in-depth search of past and current literature on a special topic. Arrangements for QRI's must be made with the Project Officer.

OTHER AMIC SERVICES

AMIC can provide EPA personnel with copies of short articles (20 pages or less) and loan copies of longer reports which are unavailable from local library facilities. AMIC also furnishes assistance in determining availability of translations, emergency translation services (if warranted), review of ongoing research projects through the Science Information Exchange, and other information services as required.

The address for AMIC is:

ANALYTICAL METHODOLOGY INFORMATION CENTER

Battelle, Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

The principal investigators, Ralph L. Darby and Robert L. Little, will be happy to answer any questions or to assist in any way possible. Call FTS 614-299-8045, and ask for Ext. 3264 or 2071.

The Project Officer should be contacted for assistance in utilizing AMIC. His address and telephone number are as follows:

Dr. Cornelius I. Weber
Analytical Quality Control Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268
Phone: 513-684-2913

FIGURE 8. AMIC PAMPHLET (CONTINUED)

SECTION XVIII

NATIONAL ENVIRONMENTAL INFORMATION SYMPOSIUM (NEIS)

Over the past year, the National Environmental Research Center, Cincinnati, planned a National Environmental Information Symposium scheduled for September 24-26. Because of the obvious involvement of AMIC in this area, Battelle's Columbus Laboratories sponsored a display which included facilities to demonstrate the capabilities of the interactive information system and sample products of the Center. A large number of convention attendees, both EPA and non-EPA, expressed interest in the Center and its activities. The reactions of attendees further indicated the need for the services that the Center has provided.

SECTION XIX

NON-EPA ACCESS

One effect of the publicity accorded the AMIC was that interest was stimulated both within and outside EPA. Following the announcements of the Center, a number of inquiries were received from the private sector regarding the availability of the "Reviews", the QRI services, and access to the interactive data base.

Reviews

As described in Section V arrangements were made with the National Technical Information Service to market the "Reviews" to the public. Consequently, persons inquiring about this facet of the AMIC services were referred to NTIS. On a few occasions, sample copies were provided to inquirers if the Project Officer so instructed.

Computer Access

In addition to the "Reviews" a number of the inquirers requested information on direct access to the AMIC Information Base and also on the QRI service. A list of inquirers is contained in Table 16. The Project Officer in a letter dated May 4, 1972, to the Battelle-Columbus Laboratories stated that "the Office of Research and Monitoring, EPA, wishes to provide such access on a cost-recovery basis under provisions of the 'Freedom of Information Act' and a plan for providing such 'outside' access at an early date". The letter went on to state: "Thus, the AMIC data base will be useful to a broad spectrum of government and private groups, and arrangements for 'outside' access to the system should be completed as soon as possible."

On June 13, 1972, a plan was submitted to the Project Officer whereby such access could be granted to non-EPA users on a cost-recovery basis. The Project Officer requests headquarters approval to grant private access, but as of November 30, 1972, the completion date of the contract period, no ruling was made concerning the request.

Plan for Access to the Information System

The EPA provision that public access be on a cost-recovery basis has created a new dimension in project management, requiring a separate costing mechanism. This is described in the following excerpt from the June 13th letter.(2)

(2) Certain cost figures have been modified to reflect current conditions rather than those which existed at the time the letter was written.

TABLE 16. FACILITIES INDICATING INTEREST IN AMIC SERVICES AND PRODUCTS

Facility	Interest		
	Reviews	Computer Access	Technical Assistance
American Petroleum Institute	X	X	
Argonne National Laboratory	X	X	
Atlantic Richfield Company	X		
Battelle's Pacific Northwest Laboratories		X	
Betz Laboratories	X	X	X
Bunker Hill Company	X	X	
University of California, Davis	X		
Canada, Department of Lands, Forests, and Water Resources	X		
University of Canterbury	X		
Charles County Community College	X		
University of Connecticut	X		

TABLE 16. FACILITIES INDICATING INTEREST IN AMIC SERVICES AND PRODUCTS (Continued)

Facility	Interest			
	Reviews	Computer Access	Technical Assistance	
Diamond Shamrock Corporation	X			
E.I. duPont de Nemours & Company	X	X		
FMC Corporation	X			
General Motors Corporation	X			
State of Illinois, Environmental Protection Agency	X	X		
Institute of Paper Chemistry	X	X		
International Business Machines Corporation	X			
International Nutronics, Inc.	X	X		
Iowa State University	X			
Lever Brothers Company	X	X		
Monsanto				X

TABLE 16. FACILITIES INDICATING INTEREST IN AMIC SERVICES AND PRODUCTS (Continued)

Facility	Interest		
	Reviews	Computer Access	Technical Assistance
National Council of the Paper Industry for Air and Stream Improvement, Inc.	X		
New York Ocean Science Laboratory	X		
P. R. Mallory & Company, Inc.	X		
Schmoeger, Mr. Donald R.	X		
Sun Oil Company	X	X	
Tennessee Valley Authority	X	X	
Texas A & M University	X	X	
Union Carbide Corporation	X		
U.S. Army, Cold Regions Research & Engineering Laboratory	X		

TABLE 16. FACILITIES INDICATING INTEREST IN AMIC SERVICES AND PRODUCTS (Continued)

Facility	Interest		
	Reviews	Computer Access	Technical Assistance
U.S. Army, Picatinny Arsenal	X		
U.S. Department of the Interior, Geological Survey	X		
West Virginia District of Water Resources	X		

"AMIC utilizes a Battelle-developed information system program known as BASIS-70. Current access costs to BASIS-70, and hence to AMIC for EPA Agencies, are based upon terminal connect time and billed at the rate of \$30 per hour (\$0.50) per minute). However, in servicing organizations other than EPA, some form of service charge would have to be included to cover additional costs anticipated in controlling access, providing instructions to individual organizations gaining access, and in accounting procedures.

"Identification of costs is based upon controlled passwords and numbers, and the user must be responsible for the security of such identification. Both EPA and Battelle-Columbus Laboratories should reserve the right to revoke such identification either upon misuse of the system (non-R & D purposes), or for non-reimbursement of costs.

"Access may be by any teletype compatible equipment operating at 10 characters per second (e.g., Hazeltine 2000, Execuport, Portacom, etc.). It is anticipated that the system shortly will be modified to accept 30 cps equipment in the near future. At that time, a modest cost increase is anticipated. Off-line prints, also soon to be available, are billed additionally. Costs for the terminals and telephone me are not included in the above charges.

"At present we are visualizing offering industrial organizations and technical societies a minimum monthly charge of \$75 per month plus a charge of 75 cents per connect minute (4.50 minimum per computer/terminal connect). Pursuant to your request, all billing will be done by Battelle-Columbus. Assignment of identification numbers and distribution of instructional materials will be handled by the Laboratories, with no costs accruing to the EPA project."

QRI Services

In addition to direct computer access to the AMIC data base, Battelle would also be in a position to offer support to industrial companies and/or institutions in the form of technical analysis and technical assistance. This might be in a form similar to the "Quick Response Inquiry Service" which is currently included in the services offered under EPA Contract No. 68-01-0166. Or, alternatively, more extensive technical assistance could be included. Should such technical assistance be desired by individual industrial or technical institutions, it would be offered completely independently of the current EPA contract in the form of technical assistance programs. In this case, such programs would be billed for access to the AMIC data base in a manner similar to the industrial organizations.

SECTION XX

POSSIBLE ALTERNATE MODES OF OPERATION OF THE AMIC

For many years library and information services in the U. S. have been widely available, often at no direct cost to the user. The result has been that many persons are not aware of the true cost of these services. This fact, coupled with the frequent opinion of scientific and technical staff that they adequately cover the literature themselves, makes specialized information services difficult to fund. The consequence is that these specialized information services are often not made available or are inadequate. In addition, costs associated with information centers, primarily personnel costs, are continuing to rise. It is therefore necessary for information managers to develop alternate methods of operation to minimize costs as much as possible. The Analytical Methodology Information Center staff has looked critically at the costs of operating the Center and presents herein some suggestions for alternate operation which should serve to reduce costs, increase efficiency of operation, and improve the utility of the Center within the EPA community.

First and foremost in any operation, duplication of effort must be avoided wherever possible. For AMIC this means that the Center's relationship with EPA libraries and other information centers should be carefully defined and the responsibilities of each delineated. All requests for document loans or copies, reference look up, and other types of library services relative to AMIC should be directed to the EPA libraries since full-time staffs are supported to provide these services. Of course, a mechanism must be established to insure that at least one EPA library, probably the NERC-Cincinnati Library, has the AMIC documents. As suggested previously, one means for accomplishing this would be for AMIC to regularly inform a library, such as the NERC-Cincinnati Library, of the documents acquired or provide copies of them.

Further, the centers and libraries within EPA should keep one another informed of their activities and products so that each can make as much use as possible of the work that has been done by other facilities. The AMIC touched on this type of activity by announcing the availability of QRI's. Several EPA libraries requested that all QRI's be provided upon completion.

For such an interactive arrangement to be effective, one person at each facility must be assigned the responsibility of keeping other facilities informed and serving as the coordinator for incoming and outgoing requests. It is important that coordinators respond in a timely fashion. The result of such an arrangement, as shown in Figure 9, is an interactive network of information facilities interconnected by telephone and mail services.

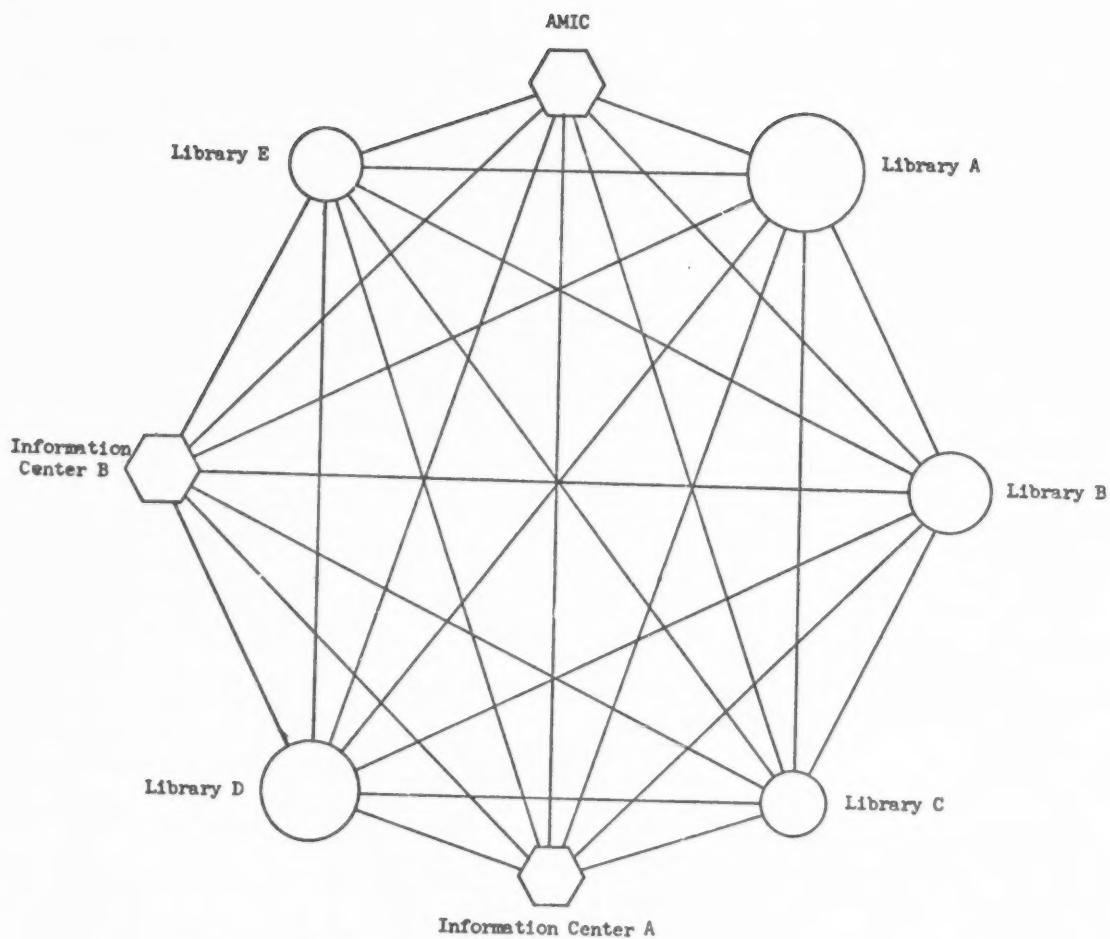


Figure 9. INTERACTIVE NETWORK OF EPA LIBRARIES AND INFORMATION CENTERS

Note: For further discussion of the concept of information networks and of the above diagram see EPA Report No. 16020 FSO 06/71, "Design and Operation of an Information Center on Analytical Methodology", June, 1971, Appendix A.

Reduction of Information Processing Costs

At the present time, there are several constraints which limit modification and consequent reduction of the cost of information processing. First, the Center currently is obligated by contract to provide input to the Water Resources Scientific Information Center in a compatible format. This means that informative abstracts must be prepared, indexed, and typed on WRSIC's standard form. As described in the report of the FY-71 study, the cost of providing this input has been minimized by using paper-tape typewriters and using a format which is compatible with WRSIC's. However, at 1972 staff rates, the cost for providing WRSIC input (including hard copy) was \$4.00-\$5.00 per item.

Further, the AMIC abstracts have been prepared according to the specifications of the AQCL staff. Therefore, there are limited alternatives available. Several are described below:

- (1) Author Prepared Abstracts. Author prepared abstracts may be employed (with or without modification) if they conform to specifications and if permission is granted by publishers. It should be noted that WRSIC feels that if an abstractor takes time to check the adequacy of an abstract, he can easily prepare a complete abstract. The experience of the AMIC staff has shown that the use of prepared abstracts does reduce the abstracting time but may require some modification to achieve proper orientation for the AMIC users. An example of this would be a document on sewage treatment which included analytical methodology. Since sewage treatment is not within the scope of AMIC, that aspect of the document would be minimized and the pertinent parts emphasized. Further, some abstracts are much better prepared than others. Consequently, in some instances it may be necessary to completely prepare the abstract. Nevertheless, it is recommended that the Center continue to request permission from publishers to use prepared abstracts and that these be used and modified where necessary. No estimate can be made of the cost saving realized with this approach.
- (2) Reduce Depth of Abstracting. During the current year the AMIC staff gave considerable attention to the possibility of reducing the depth and detail of the abstracts being prepared. This is the single most costly operation performed by any center because of the intellectual effort involved. The abstractor must be able to quickly read a document and grasp the significant points in view of the user audience being served. Writing the proxy has all of the pitfalls of grammar, sentence structure and meaning as is experienced in any original writing.

However, as previously discussed, both the WRSIC guidelines and the desires of the user audience at AQCL dictate an informative abstract. In order to maintain the informative nature of the AMIC data base, the AMIC staff continued in-depth abstracting.

- (3) Reduce Depth of Indexing. Although indexing is relatively inexpensive compared to abstracting, indexing of species names in some documents becomes very time consuming. Elimination of these terms would somewhat reduce processing costs. However, the effect on the usefulness of the interactive information base must be considered. These terms have been used in AMIC at the specific request of the users and should not be eliminated without careful study. Indexing time can also be reduced by incorporating at least some generic posting in the computer input program. However, time and costs would be involved in defining the generic relationships and preparing the programs.

Publication of the "Reviews"

Since agencies of the Federal Government have access to the services of the Government Services Administration and the Government Printing Office, consideration should be given to having one of these agencies print the "Reviews". This approach would require that agreements be set up to assure that printing and distribution would be done promptly. Such an arrangement would make use of established government capabilities, presumably at reduced cost, and consequently reduce the costs charged directly against the Center.

On-Line Interactive Information Base

There are several alternatives which can reduce costs relative to the information/data base. The first involves transferring the base to the Research Information Division's Project Information Research System (ENVIRON) as discussed earlier. However, since ENVIRON cannot yet satisfy some of the requirements of AMIC, this transfer is sometime in the future. Nonetheless, some of the suggested alternatives are applicable to any system.

During the present contract period, the Center covered the cost of renting three remote terminals. Contract costs would be reduced if each facility were required to provide its own terminal as was done by many of the laboratories served. Likewise, the Center covered connect time costs for all users of the information base. Consideration should be given to billing each facility directly according to use. Caution should be used, however, so that use of the system is not eliminated or severely restricted because of the unavailability of funds or lack of a simple mechanism for paying charges. One problem for the facility operating the Center is that separate billing involves additional work, the cost of which will have to be covered by contract funds.

Computer storage for the information base should also be considered as a possible area of cost reduction. The bulk of the storage for AMIC at present results from the textual portion of the abstracts. Although storage costs are decreasing with technological advancements, the costs increase as the base grows and are perpetual. Therefore, if these costs can be reduced, a savings will result as long as the information base is loaded on the computer. One possible means of reducing the amount of information in storage is to eliminate the abstracts from the information base. The interactive system could still be searched in the same manner and display author names, titles, facilities, bibliographic citation, index terms (if desired), and chemical effects data. Instead of displaying the abstracts on the computer, the Center could provide either volumes of abstracts or abstract cards which could be filed in numerical order. These abstracts would be stationed next to the remote terminals. Upon completion of a search, the user would obtain the accession numbers and review the abstracts in the accompanying file. Of course, this approach requires that someone be assigned to maintain the file. There is also the possibility that the reference abstracts could be lost or removed.

Battelle has a more sophisticated means for reducing computer storage requirements. This involves prototype equipment which combines a cathode ray tube (CRT) terminal with a microfiche display system. The equipment allows the user to search a computerized information base as usual. However, when he requests a display, the computer activates the microfiche carousel unit which displays the proper microfiche on the CRT. The system has additional capabilities, and improvements are being added since it is still in the prototype storage. One limitation at the present time is that the full ensemble is required at each user facility and at present is rather expensive. However, technological advances may bring reduced costs or the capability for a centralized unit which can display the microfiche over long distance lines.

Processing Backlog Material

During the current year the backlog of items in the Center has continued to grow because of the unanticipated increase in available information. Much of this information is very important in retrospective searches. Consequently, economical methods need to be developed to make this information available on the interactive system. As described in page 16 it is possible to process the references alone for free-text searching on titles. However, this method is far from ideal. A more desirable method would be to index these documents, probably at a cursory level. Indexing is relatively inexpensive compared to indexing, but does provide an accurate indication of the content of a document. A suitable prefix could be used with these index terms to separate them from those documents completely indexed. This would be necessary since different search strategies would be involved with the two types of indexing. Using this procedure, it should be possible to process a large amount of these documents at relatively low cost.

The suggested options offered here are not purported to be the only ones available. Furthermore, some of them should not be instituted without thorough consideration of their consequences. It can be concluded, however, that the Center must continue to look for ways to minimize operating costs within the constraints of the user requirements by improving the efficiency of the operation.

SECTION XXI

ACKNOWLEDGMENTS

The authors wish to thank Dr. Cornelius Weber, Project Officer and Chief of the Biological Methods Activity at the Analytical Quality Control Laboratory, for his guidance and assistance during the operation of the AMIC. Appreciation is also extended to the staff of the AQCL and other EPA facilities for their interest in the activities of the Center and to Messrs. John Mortland, Ronald Byrd, George Long, Michael Mackan, Ronald Snyder, and Miss Verna Holoman, Information Scientists, and Mrs. Naomi Cranston, Mrs. Donna Knight, and Mrs. Imogene Culver, typists, for their able assistance in operating the Center.

Robert L. Little
Ralph L. Darby

SECTION XXII

REFERENCES

1. "Design and Operation of an Information Center on Analytical Methodology", Battelle Memorial Institute, Columbus, Ohio, Water Pollution Control Research Series 16020 FSO 06/71, EPA Contract No. 14-12-862, June 1971, 131 pp.
2. "Water Quality Criteria Data Book, Volume 3. Effects of Chemicals on Aquatic Life", Kemp, H. T., Abrams, J. P., Overbeck, R. C., Battelle Memorial Institute, Columbus, Ohio, Water Pollution Control Research Series 18050 GWV 05/71, EPA Contract No. 68-01-0007, May 1971.
3. "Scientific and Technical Communication", Passman, S., Pergamon Press Inc., Oxford, 1969, p 52.

SECTION XXIII

APPENDICES

- A. JOURNALS REVIEWED FOR THE ANALYTICAL METHODOLOGY INFORMATION CENTER, DECEMBER, 1971-NOVEMBER, 1972
- B. SAMPLE PAGE FROM THE "REVIEWS"
- C. "REVIEWS" DISTRIBUTION
- D. AMIC USER GUIDE
- E. RESPONSES TO AMIC QUICK RESPONSE INQUIRIES

APPENDIX A. JOURNALS REVIEWED FOR THE ANALYTICAL METHODOLOGY
INFORMATION CENTER, DECEMBER, 1971-NOVEMBER, 1972

JOURNALS SCREENED BY THE
ANALYTICAL METHODOLOGY INFORMATION CENTER

<u>Title</u>	<u>Estimated Items Per Year</u>
AMBIO	12
American Journal of Public Health	7
*American Midland Naturalist	24
*Analyst	36
*Analytica Chimica Acta	108
Analytical Biochemistry	40
*Analytical Chemistry	297
Antonie van Leeuwenhoek	25
*Applied Microbiology	123
Applied Spectroscopy	9
*Archiv fur Hydrobiologie	12
Archiv fur Mikrobiologie	91
*Atomic Absorption Newsletter	18
Bacteriological Reviews	2
Biometrics	6
Bioscience	14
Biotechnology and Bioengineering	27
*Bulletin of Environmental Contamination and Toxicology	65
Canadian Entomologist	12
Canadian Journal of Microbiology	40
*Chemical and Engineering News	2
*Chemical Engineering	33
Chemical Processing	2
*Chemical Week	12
Control Engineering	6
CRC - Critical Reviews in Environmental Control	5
Deep-Sea Research and Oceanographic Abstracts	38
Dissertation Abstracts	40
Doklady Biological Sciences	9
Ecological Monographs	5
Ecology	17
EID - Electronic Instrumentation	5
Environmental Pollution	26
*Environmental Science and Technology	55
Fresenius' Zeitschrift fur Analytische Chemie	98

* Subscriptions to these journals were purchased by AMIC.

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Gaylor's Technical Survey	--
Government Reports Announcements	384
*Hydrobiologia	76
Hydrocarbon Processing	7
IEEE Transactions on Industrial Electronics and Control Instrumentation	2
IEEE Transactions on Instrumentation and Measurement	2
Industrial Research	4
*Industrial Water Engineering	5
Instrumentation Technology	4
Instrument Practice	8
Instruments and Control Systems	6
Internationale Revue der Gesamten Hydrobiologie	22
International Journal of Applied Radiation and Isotopes	24
Izmeritel'naia Tekhnika	12
Journal of Agricultural and Food Chemistry	58
Journal of Animal Ecology	6
Journal of Applied Bacteriology	20
Journal of Applied Chemistry and Biotechnology	40
Journal of Bacteriology	61
Journal of Chromatographic Science	36
Journal of Chromatography	74
Journal of General Microbiology	38
Journal of Milk and Food Technology	12
Journal of Organic Chemistry	0
*Journal of Phycology	32
Journal of Physical Chemistry	4
*Journal of Quality Technology	13
Journal of the American Oil Chemists' Society	18
Journal of the American Statistical Association (JASA)	8
*Journal of the American Waterworks Association	24
*Journal of the Association of Official Analytical Chemists	90
Journal of the Electrochemical Society	4
*Journal of the Fisheries Research Board of Canada	144
Journal of the Hydraulics Division, Proceedings of the American Society of Civil Engineers	10
Journal of the Institute of Petroleum	12
Journal of the Irrigation and Drainage Division, Proceedings of the American Society of Civil Engineers	4
Journal of the Sanitary Engineering Division, Proceedings of the American Society of Civil Engineers	28

<u>Title</u>	<u>Estimated Items Per Year</u>
Journal of the Science of Food and Agriculture	17
*Journal Water Pollution Control Federation	89
Khimiya i Tekhnologiya Topliv i Masel	27
Laboratory Practice	22
*Limnology and Oceanography	125
Limnos	1
Marine Biology	81
Marine Pollution Bulletin	18
Mathematical Biosciences	8
*Measurements and Data	12
Microchemical Journal	21
Microscope	2
Mikrochimica Acta	27
Mycopathologia et Mycologia Applicata	12
Nature	28
Nature - New Biology	8
*New Scientist	6
New Zealand Journal of Science	1
*Nova Hedwegia	68
Oceanology International	9
Oikos	16
Okeanologiya	27
*Pesticides Monitoring Journal	23
Petroleum Engineer	0
Philosophical Transactions of the Royal Society of London, Series B	0
*Phycologia	32
Pollution Engineering	2
*Potomac Basin Reporter	0
Prikladnaya Biokhimiya i Mikrobiologiya	12
Proceedings of the Indian Academy of Sciences, Section B	8
Proceedings of the National Academy of Sciences	0
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Quality Progress	4
R/D - Research Development	10
Review of Scientific Instruments	14
Schweizerische fur Zeitschrift Hydrologie	15
*Science	52
Science News	10
Sciences, The	0
Technometrics	13
Transactions of the New York Academy of Sciences	2
Water and Pollution Control	11

<u>Title</u>	<u>Estimated Items Per Year</u>
*Water and Sewage Works	21
*Water and Wastes Digest	0
*Water and Wastes Engineering	4
Water and Water Engineering	6
*Water Pollution Control Federation Highlights	1
*Water Research	56
Water Resources Research	16
*WHO Chronicle - World Health Organization	0
World Petroleum	0
Zhurnal Analiticheskoi Khimii	33
Total	<u>3589</u>

JOURNALS IDENTIFIED BUT NOT SCREENED BY THE
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Advances in Virus Research
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Chromatographic Reviews
Contributions in Marine Science
Current Contents
Currents in Modern Biology
EEE
Environment
Environmental Engineering and Environmental Engineer
Gigiena i Sanitariya
Health Laboratory Science
Hydrological Sciences Bulletin
Instrumentation
Instenationalen Vereinigung fur Theoretische und Angewandt Limnologie,
Mitteilungen
International Journal of Air and Water Pollution
ISA Transactions
Japanese Journal of Microbiology
Journal of Applied Ecology
Journal of Ecology
Journal of Experimental Marine Biology and Ecology
Journal of Food Science
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Journal of Virology
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Plant and Soil
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Proceedings of the International Association of Theoretical and
Applied Limnology

Proceedings of the Royal Society of London, Series B
Remote Sensing of Environment
Transactions of the American Microscopical Society
Virology
Virology Abstracts
Water, Air, and Soil Pollution
Zavodskaya Laboratoriya
Zhurnal Neorganicheskoi Khimii

APPENDIX B. SAMPLE PAGE FROM THE "REVIEWS"

1. PHYSICAL AND CHEMICAL METHODS

AMIC-1041 "TRACE POLYCHLORINATED BIPHENYL CONCENTRATION IN THE MURDOCH ENVIRONMENT", Holden, A. V., <u>Science</u>, Vol. 225, No. 5771, December 19, 1970, pp 1220-1221. High concentrations of polychlorinated biphenyls have been detected in the Firth of Clyde (Scotland). Samples of the water surface film and sub-surface water were taken at various points in the estuary, and also at 200 m and 400 m depths. PCB residues could be found (limit of detection in water, 1 part in 10¹¹) and were of effluents discharged from trunk sewers into the estuary and in the Glasgow area also showed no significant concentrations of PCBs. Concentrations in zooplankton by extraction were less than 0.03 p.p.m. and in clupeoid fish up to 2.6 p.p.m. (both extracts were wet-weight basis). Samples of crude sewage sludge from such sewage plants in Glasgow and adjacent areas were analysed for PCBs. It seems possible that the PCBs in the Clyde estuary are from routine dumping of crude sewage sludge from treatment works in Glasgow and adjacent areas. If there is an average of 2 p.p.m. dumped at a rate of 0.5 million tons of sludge per year, about 1 ton of PCB isomers per year would be discharged. INDEX TERMS: Industrial wastes, Sludge, Domestic wastes, Detergents, Chlorine, Gas chromatography, Dieldrin, Pesticide residues, Zooplankton, Herrings, Path of pollutants, Polychlorinated biphenyls, Gas-liquid chromatography, DDE, Organochlorine, Scotland.	AMIC-1050 "A RAPID METHOD FOR THE IDENTIFICATION AND INTERPRETATION OF CAPTAN", Vivascorial, E., Jarama, M., Mulander, S. L., <u>Analytica Chimica Acta</u>, Vol. 52, No. 3, December 1970, pp 359-361. The reaction of Captan with monothiolamine in the presence of insecticides such as Aldrin, DDT, BHC, Malathion can be used for quantitative identification. Captan when hydrolysed with monothiolamine for 1 min in a boiling water bath, turns from likely blue, which gradually becomes yellow on further heating; concentrations of Captan above 100 micrograms under identical conditions first turn pale-yellow, then orange-red on prolonged heating. The chlorinated insecticides like BHC, DDT, Lindane, Dieldrin and Endrin did not produce the blue color, hence the reaction can also be used to distinguish Captan from the other chlorinated insecticides. Captan was detected in different formulations consisting of starch and Captan, by means of a calibration curve, and it was established that the precision of the method was $\pm 2.5\%$. Captan, when above 100 micrograms produced different colors depending on the quantity, when with 0.1-2.0 mg, an orange color with 2.4 mg, a red color with 4-5 mg and a blood-red color with 5.0 mg. Accordingly, an approximate estimate of Captan concentration can be made in this range. INDEX TERMS: Pesticides, Analytical techniques, Pollutant identification, Aldrin, DDT, Dieldrin, Hydrolysis, Captan, Lindane, BHC, Malathion.
AMIC-1043 "PROBLEMS IN WATER ANALYSIS FOR PESTICIDE RESIDUES", Berenson, A., Kelley, T. W., <u>Water, J. W., Journal of Chromatography</u>, Vol. 54, No. 1, January 6, 1971, pp 71-76. When water samples are analyzed for pesticide residues by means of gas chromatography, some samples will contain non-pesticide chemicals that possess analytical characteristics similar to some pesticides. False data also may be acquired from extraneous sources in the analytical laboratory. This report reviews some of these problems. Sources of contamination that may interfere with analysis in the parts per billion range include organic solvents, glassware, plastic ware, cellulose extraction thimbles, filter paper, and silica gel. To their use, heat treatment of the glassware and silica gels is recommended to eliminate contaminants. Plastic ware and filter paper should not be included in the analytical procedure. INDEX TERMS: Gas chromatography, Pesticide residues, Pollutant identification, Aldrin, DDT, Silica, Gels, Organic matter, Solvents, Plastics, Cellulose, Thin-layer chromatography, DDE, DDT, Septachlor epoxide, Glass, Chemical interference.	AMIC-1056 "TOXIC CHEMICALS--THE RISK TO FISH", Huddesley-Thomas, L. E., <u>New Scientist</u>, Vol. 49, No. 734, January 14, 1971, pp 74-75. Tests recommended by both U. S. and British authorities for determining the toxicity to fish of pesticides are reviewed and their inadequacies discussed. Suggestions are made for long-term studies that would provide more viable information. The approximate toxicities of pesticides most commonly used in Britain are presented. INDEX TERMS: Toxicity, Pesticides, Fish, Aldrin, DDT, Dieldrin, Endrin, 2,4-D, Heptachlor Phenolic pesticides, Sulfur, Amoxicarbolic, Dalapon, Water pollution effects, Rainbow trout, Channel catfish, Sunfish, Salmon, Goldfish, Herring.

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APPENDIX D. AMIC USER GUIDE

USER GUIDE

AUTOMATED SEARCHING

of the

AMIC DATA BASE

Utilizing

BAIS-70

February, 1972

BATTELLE
Columbus Laboratories
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(Revised June 1, 1972)

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USER GUIDE
AUTOMATED SEARCHING

of the

AMIC DATA BASE
Utilizing BASIS-70

February, 1972

I. INTRODUCTION

The Analytical Methodology Information Center (AMIC) is being developed and operated, under EPA Contract No. 68-C1-0166, to provide information support to the Analytical Quality Control Laboratory (AQCL) and other segments of the National Analytical Methods Development Research Program (NAMDRP).

The AMIC data base is a relatively small, but highly select, body of documentation limited to known user requirements and to literature processed during active contractual periods. Any user within EPA who needs more exhaustive coverage of the literature or other assistance, should contact the Center directly at:

Area Code 614, 299-3151,
Extension 3264 or 2071

In order that this specialized data base may be made available to interested members of the NAMDRP, an interactive computer system called BASIS-70 (Battelle Automated

Search Information System) has been employed. Authorization for searching the AMIC data base is controlled by the Project Officer:

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Cincinnati, Ohio 45268

Telephone: Area Code 513, 684-2913

This booklet is intended as a brief instruction for AMIC users. If you desire further information or assistance, please feel free to contact one of the following persons at the Center:

Robert L. Little or Ralph L. Darby
Battelle
Columbus Laboratories
505 King Avenue
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Area Code 614, 299-3151
Extension 3264 or 2071

Following are brief instructions which describe the use of BASIS-70 for making searches of the AMIC information base. The instructions are arranged in two columns. In the left-hand column are instructions and explanations. In the right-hand column are examples of either computer output or user commands. All sample inputs and commands by the user are underlined. It is hoped that this arrangement will assist the user in comparing the computer read-outs with the instructions.

A sample query (see Section XVII) is attached for reference which is a replica of an actual search of the AMIC information file. The user can reproduce the search sequence shown in the sample query, step-by-step, if he so desires. However, it should be emphasized that, by following the routines illustrated in this guide, the user may construct his own search profile.

To meet user requirements, AMIC abstracts have been prepared to be as informative as possible. Thus, they are lengthy. Further, the indexing used for each abstract is much more detailed than found in any comparable data bases.

Currently, most terminal devices compatible with Battelle's CDC 6400 computer are limited to 10 characters per second (Teletype speed). Under these circumstances, printouts from lengthy searches may appear slow, and it is suggested that off-line

printouts be used for such lengthy searches. By April, 1972, it is anticipated that three speeds will be available; 10, 14.8, and 30 characters per second. This will greatly enhance the power of the system and permit lengthier searches of the AMIC data base.

II. TERMINAL EQUIPMENT

At present, any TTY (Teletype) compatible terminal can be used to access AMIC. Instructions for a particular terminal can be supplied on request.

AMIC has elected to use, for the present, the Hazeltine 2000 which consists of a CRT, a printer, and an acoustic coupler. This user guide is based upon the Hazeltine 2000.

There are three power switches to be turned on; one each on the coupler, the CRT, and the printer. Once equipment is on, dial the computer at Area Code 614, 299-3111. The computer answers with a data tone which will activate the terminal when the telephone cradle is placed on the data coupler. It is important that this be done quickly so that the tone is not lost. Normally, the switches on the coupler should be set to "acoustic" and "half". If the green light on the coupler fails to come on, try "Induc". As soon as contact is established, acknowledgement will appear on the screen and the system is ready for use.

III. LOGGING IN

After telephone contact has been established with the computer, it will respond The user then types <i>Note: The carriage return key must be pressed each time the user completes an entry. Failure to press the carriage return key will cause the system to stand idle.</i> Occasionally the system fails to interpret the initial LOGIN. entry and will again print The user must re-enter The system will then request a valid USER NAME and PASSWORD <i>Note: To insure the security of the files using BASIS, both USER NAME and PASSWORD are unique to each user and must be obtained through the AMIC Project Officer prior to operating the system.</i> If the codes submitted by the user are valid, the system will acknowledge by printing The user must request the Information Systems program by typing After a very short delay, the computer will signal that BASIS is ready. Revised 4/3/72	BATTELLE INTERCOM 3.0 DATE mm/dd/yy TIME hh.mm.ss PLEASE LOGIN. <u>LOGIN.</u> Carriage Return <i>Note: The underline denotes an action taken by the user.</i> PLEASE LOGIN. <u>LOGIN.</u> ENTER USER NAME - <u>AAAAAAAAA</u> ENTER PASSWORD - <u>999999999</u> mm/dd/yy LOGGED IN AT hh.mm.ss. WITH USER-ID KY EQUIP/PORT 60/65 COMMAND- <u>BASIS.</u> (PHASE I) B A S I S 70 IS ON LINE: DO YOU DESIRE OPERATING INSTRUCTIONS? TYPE YES OR NO/NO
III. LOGGING IN	

III. LOGGING IN (Continued)

The system will then request your name. <i>Note: Each time the system terminates a message with a slash, it is waiting for a user response. The system will stand idle until the user makes the required response.</i>	<i>Note: The instructions are available for emergency use. They are rather lengthy and will not normally be required by the knowledgeable user.</i> PLEASE ENTER YOUR LAST NAME, <u>/DARBY</u>
III. LOGGING IN (Continued)	

IV. REQUESTING THE AMIC DATA BASE

There are many different data bases in BASIS, each identified by an acronym. The correct acronym must be used. The system will ask which data base is desired. The user should type AMIC after the slash.

Should the user enter an incorrect acronym, the system would respond

A few seconds' delay will occur while the computer brings AMIC on-line. When AMIC is ready for use, the system will send the following message:

AMIC is now on-line and the user may begin his search.

ENTER THE NAME OF DATA BASE TO BE SEARCHED.
/AMIC

IM SORRY. WE HAVE NO FILE NAMED XXXX.
PLEASE RE-ENTER
/AMIC

AMIC DATA BASE SPONSORED BY EPA
UNDER CONTRACT 68-01-0166
TOTAL ITEMS IN BASE xx xxx
LATEST UPDATE mm/dd/yy
ENTER YOUR SEARCH ONE TERM AT A TIME.
1/

IV. REQUESTING THE AMIC DATA BASE

V. SHORT FORM LOGIN

A much shorter LOGIN technique is available for the knowledgeable user. He may combine his commands so as to enter directly into AMIC in two steps.

After telephone contact has been established with the computer, it will respond...

At this point the user may combine his LOGIN command, USER NAME, PASSWORD, plus two other commands as shown.

Note: The SUP means to suppress all normal LOGIN procedures. The N indicates you do not want news on the computer status.

The computer will respond

The user may then enter the combined form

After a few seconds the computer will respond

There will be another brief pause and AMIC will come on line.

The user may begin his search.

Revised 4/3/72

BATTELLE INTERCOM 3.1
DATE mm/dd/yy
TIME hh.mm.ss.
PLEASE LOGIN.

LOGIN. AAAAAAAAAA. 99999999. SUP. N.

COMMAND

BASIS. NAME. AMIC.

(PHASE 1) BASIS 70 IS ON LINE:

AMIC DATA BASE SPONSORED BY EPA UNDER CONTRACT 18-01-0166
TOTAL ITEMS IN BASE xx,xxx
LATEST UPDATE mm/dd/yy
ENTER YOUR SEARCH ONE TERM AT A TIME.
1/

V. SHORT FORM LOGIN

VI. QUERY BUILD-UP

The system is ready for the user's search. Assume that the user desired information on techniques for determining DDT by gas chromatography. He would enter his first term The system would respond telling him the number of items in AMIC discussing DDT. The second term would be entered The user is also concerned about separation techniques. <i>Note: Each term must be entered separately and each valid term is assigned a unique line number. If a given term produces no hits, the line number is available for re-use.</i> Authors may be used as a search term by entering his name preceded by AU. Last name should be entered first, followed by first initial. Facilities may also be used as search terms if preceded by FAC Should an entered search term not be in the data base, the system will respond The user now has an option. If he types NO, the system will call for another search term. If he types YES, two adjacent terms before and after his term will be displayed. See ADJACENT TERM OPTION.	ENTER YOUR SEARCH ONE TERM AT A TIME 1/ <u>DDT</u> 25 ITEMS 2/ <u>GAS CHROMATOGRAPHY</u> 39 ITEMS 3/ <u>SEPARATION TECHNIQUES</u> 27 ITEMS
4/ <u>AU LAN, L.</u> 5/ <u>FAC ARIZONA UNIVERSITY</u> 6/ <u>ATMOSPHERE</u> NO SUCH TERM. WANT ADJACENT TERMS? YES:NO/	

VI. QUERY BUILD-UP

VII. LOGICAL (Boolean) COMBINATIONS

The identification of documents pertaining to the desired index terms is accomplished through the use of logical (Boolean) statements employing AND/OR logic. The use of logical statements involves the combination of lines numbers which represent the desired terms with the appropriate connectives (AND, OR). All logic statements should be enclosed in parentheses. Assume the previous example of items on determination of DDT by gas chromatography. The logic statement would be Or, a shorthand form may be used. The system would then respond by stating the number of documents indexed by both DDT and gas chromatography The user might seek those items discussing separation techniques for DDT. If he desired items discussing all three terms, he could enter Note: A logical statement may be used as a search term once it has been established. The user might wish items on DDT that discussed either gas chromatography or separation techniques. The logical statement would read	6/ (1 AND 2) or 6/ (1 A 2) 1. ITEMS 7/ (1 A 3) 8/ (1 A 2 A 3) or 8/ (6 A 3) or 8/ (7 A 2) 9/ (1 AND 2 OR 3) or 9/ (1 A 2 O 3)
	VII. LOGICAL (Boolean) COMBINATIONS

VII. LOGICAL (Boolean) COMBINATIONS (Continued)

The logical combination may be so strict that no items meet the search parameters. The user will then need to revise his logical statement. If too many items are identified, the user may elect to further restrict his search by entering a new term... and including it in a previously structured logical statement. This process may be continued until the user is satisfied he has selected the best possible search parameters. <i>Note:</i> At any time in the search sequence, the user may elect to reconstruct his total search including both the search terms and logical combinations. This capability is provided by the LIST ALL option. Other options such as ADJACENT TERMS and STEM SEARCH are available to assist the user. See subsequent sections of this user guide.	NO DOCUMENTS REMAIN AFTER THIS LOGICAL COMBINATION 10/ 10/ <u>CHEMICAL INTERFERENCE</u> 11/ <u>(8 A 10)</u>
	VII. LOGICAL (Boolean) COMBINATIONS (Continued)

VIII. DISPLAY OF CITATIONS AND ABSTRACTS

At any stage during the query, the system allows the user to retrieve the items associated with either a single search term or a logical combination of search terms. This can be accomplished by means of a DISPLAY command as shown to the right. The command says, in effect, display all items in the data base that fulfill the conditions set forth in line 9 of the search query. When the DISPLAY command is entered for the first time in any one search, the DATA ELEMENTS for AMIC are printed on the screen.	12/ <u>(DISPLAY 9)</u>
The system requests the user to identify the DATA ELEMENTS which are to be printed for each item.	THE DATA ELEMENTS FOR THE AMIC DATA BASE ARE 1-ACCESSION NUMBER, 2-FACILITY, 3-TITLE, 4-AUTHOR(S), 5-BIBLIOGRAPHIC DATA, 6-INDEX TERMS, 7-ABSTRACT. WHAT FIELDS DO YOU WANT TO SEE? ENTER FIELD NUMBERS SEPARATED BY COMMAS OR ALL /
The user can call for retrieval of any or all of these, in any specified order, by entering the numbers associated with the elements or ALL (see CAUTION below). The system then proceeds to print the called-for information.	/ <u>1,4,2,3,5</u> ITEMS FROM THE AMIC DATA BASE ARE ITEM 1 ACCESSION NUMBER : 627 AUTHOR(S) : BREIDENBACH, A. W., LICHTENBERG, J. J., HENKE, C. F., SMITH, D. J., EICHENBERGER, J. W., JR., STIERLI, H. FACILITY : FEDERAL WATER POLLUTION CONTROL ADMINISTRATION, WASHINGTON, D. C., DIVISION OF POLLUTION SURVEILLANCE TITLE : THE IDENTIFICATION AND MEASUREMENT OF CHLORINATED HYDROCARBON PESTICIDES IN SURF

VIII. DISPLAY OF CITATIONS AND ABSTRACTS

VIII. DISPLAY OF CITATIONS AND ABSTRACTS (Continued)

<i>Note: In this display, the user elected not to call up the abstracts in the initial display.</i> <i>Note: If after examining the results he decides to read the abstract, he may recall that item by Accession Number as shown.</i> The user decides to redisplay the information for Accession Number 1029.	ACE WATERS, BIBLIOGRAPHIC DATA : WP-22, NOVEMBER 1966 70 P. 38 FIG. 2 TAB. 71 REF. ITEM 2 ACCESSION NUMBER : 1029 AUTHOR(S) : LAU, LEROY M., GOERLITZ, DONALD F. FACILITY : U. S. GEOLOGICAL SURVEY, MENLO PARK, WATER RESOURCES DIVISION TITLE : MICROCOLUMN CHROMATOGRAPHIC CLEANUP FOR THE ANALYSIS OF PESTICIDES IN WATER, BIBLIOGRAPHIC DATA : JOURNAL OF THE ASSOCIATION OF OFFICIAL ANALYTICAL CHEMISTS, VOL. 53, NO. 6, P 1276-1286, NOVEMBER 1970. 5 FIG. 6 TAB. 23 REF. FINISHED WITH PRINTOUT. CONTINUE ENTERING SEARCH TERMS.
The user requests display of the abstract (Element 7) for Accession No. 1029. The abstract will be displayed. <i>Caution: AMIC abstracts are written so as to be very informative to the user. Hence, they are quite lengthy. It is suggested that no more than 20 citations and abstracts be printed on-line. For more than 20 items, it is suggested that the OFF-LINE PRINT capability be used.</i>	12/ (DISPLAY (1029)) <i>Note: The double parentheses is necessary whenever calling up a specific item by Accession Number.</i> WHAT FIELDS DO YOU WANT TO SEE? / 7 ITEMS FROM THE AMIC DATA BASE ARE ABSTRACT 1 IDE RESIDUE EXTRACTS OF WATER IS MADE POSSIBLE BY THE USE OF MICRO-CLEANUP COLUMNS. THREE ABSORBENTS--ALUMINA, SILICA GEL, AND FLORISIL--AS WELL AS A VARIETY OF SOLVENT SYSTEMS WERE INVESTIGATED. THE RECOVERY AND CLEANUP OF ALDRIN, CHLORDAN

VIII. DISPLAY OF CITATIONS AND ABSTRACTS (Continued)

VIII. DISPLAY OF CITATIONS AND ABSTRACTS (Continued)

For lengthy displays, the system will display 5 items. It will then print... If C is entered, the next 5 items will be displayed. If NO is entered, the system will return to the regular query format. An OFF-LINE PRINT may be requested, the query may be continued, or the user may elect to QUIT.	E, P, P' -DDD, P, P' -DDE, O, P' -DDT, P, P' -DOT, DIFLORIN, ENDRIN, HEPTACHLOR, HEPTACHLOR EPOXIDE, HEXACHLOROCYCLOHEPTADIENE, HEXACHLOROCYCLOPENTADIENE, ISODRIN, LINDANE, AND METHOXYCHLOR HERE SATISFACTORY, USING ANY OF THE THREE ABSORBENTS. THE PHOSPHOROTHIOATE PESTICIDES *MALATHION, METHYL PARATHION, AND PARATHION, HOWEVER, COULD NOT BE SUCCESSFULLY RECOVERED FROM FLORISIL WHEN A MODIFIED MILLS PROCEDURE WAS ATTEMPTED. THE MICRO-CLEANUP COLUMNS MAY ALSO BE USED TO PERFORM A PRELIMINARY SEPARATION OF A NUMBER OF COMPOUNDS THAT ARE DIFFICULT TO RESOLVE BY GLC. FINISHED WITH PRINTOUT. CONTINUE ENTERING SEARCH TERMS. ENTER C TO CONTINUE OR NO TO DISCONTINUE DISPLAY/ _____
VIII. DISPLAY OF CITATIONS AND ABSTRACTS (Continued)	

IX. OFF-LINE PRINT OPTION (To Be Implemented)

If the user desires a lengthy printout, particularly 20 items or more with abstracts, he is urged to use the OFF-LINE PRINT. This will result in considerable cost savings in terminal time and the printout will normally be mailed to the user on a same day basis if requested before 4:00 p.m. The procedure for this option is similar to the DISPLAY command. For a total search, use The system will ask Response Next, the computer will request identification. The system will respond with There will be a 3-5 second delay after which the computer will request that you continue the search. <i>Caution: If an off-line print is requested, the user should not use any abort commands, but he should exit BASIS in a normal manner. An abort may cause loss of the printout without acknowledgement to the user.</i>	xx/ (PRINT 9) WHAT FIELDS DO YOU WANT TO SEE? / 1, 4, 2, 3, 5 / PLEASE TYPE COMPLETE NAME AND MAILING ADDRESS. / YOUR REQUEST IS BEING PRINTED OFF-LINE. / ENTER YOUR NEXT SEARCH TERM.
	IX. OFF-LINE PRINT OPTION

X. CHARACTER AND LINE DELETE

Since typing errors will arise during the course of a search, the user is provided with an easy method for either deleting characters or an entire line. To erase a character(s), the user must hit the reverse arrow key (together with the shift key.)

To delete an entire line, the user must hit the "q" key before hitting the carriage return.

The system will reprint the original line number after indicating that the line has been killed.

xx/ CHRONO←ATOGRAPHY
or xx/ CHROMTO←ATOGRAPHY
xx/ (1 AND 2) @
xx/ CYNE KILLED. RE-ENTER.

X. CHARACTER AND LINE DELETE

XI. RESTART OPTION

The RESTART Command: After a particularly lengthy search, the quantity of search terms and associated line-numbers can become unwieldy. Perhaps the user may wish to restructure his search or simply begin from scratch again. This is achieved by entering the command

The result is that all previous statements, i.e., index terms, logical combinations, and commands are erased, and the user is returned to the beginning of the sequence. For example...

xx/ (RESTART)

ENTER NAME OF DATA BASE TO BE SEARCHED.
/ AMIC

XI. RESTART OPTION

XII. LIST ALL OPTION

After a lengthy search, the user may wish to recall the terms and also logical combinations already entered into the system. The command would be

All lines previously used could be displayed. Such a display might appear as

The first column shows the number of items in the data base for each term or logical combination. The next number is the line number and may be used in subsequent logical combinations.

Note: Only those line numbers corresponding to valid search terms or logic statements are permanent and retrievable. Line numbers used for invalid terms, stem options, or command statements are reused. Also, line numbers for logic statements resulting in no retrievable documents are reused.

XX/ (LIST ALL)

```

ITEMS-NO.-LINE---
*** 25 1/DDT
*** 39 2/GAS CHROMATOGRAPHY
*** 27 3/SEPARATION TECHNIQUES
*** 5 4/(1A2A3)
*** 23 5/CHEMICAL INTERFERENCE
*** 2 6/(4A5)
ENTER YOUR REQUEST
XX/
    
```

XII. LIST ALL OPTION

XIII. NEARBY TERM OPTION

The NEARBY TERM option will assist the user in selecting the precise terms needed for efficient searching. The sequence at the right illustrates the use of the option to correct a term for entry. The system would not accept CHEMICAL INTERFERENCES since that term had not been used; rather, the singular form had been used. The corrected term is entered.	ENTER YOUR REQUEST 5/ CHEMICAL INTERFERENCES NO SUCH TERM. WANT ADJACENT TERMS? YES:NO/YES ITEMS-NEARBY TERMS TO YOUR TERM 1 CHEMICAL INDUSTRY 23 CHEMICAL INTERFERENCE *** (YOUR TERM) 8 CHEMICAL OXYGEN DEMAND 1 CHEMICAL PARTITIONING 5/ 23 <u>CHEMICAL INTERFERENCE</u> ITEMS
XIII. NEARBY TERM OPTION	

XIV. STEM SEARCH OPTION

The STEM SEARCH option is very useful in exploring the vocabulary or assuring that all desirable terms are used in the OR combination. The user has the capability of listing any terms in the file containing the desired stem. The format for the stem option is The first 10 terms having the specified stem will be displayed. If additional terms are desired, the user may specify the number of terms desired A sample search might be... The response would be... <i>Note: The number to the left of each term signifies the number of items in the data base indexed by that term.</i>	XX/ STEM*
XX/ STEM* nn	XX/ STEM* nn
XX/ CLOSTRID* 20	XX/ CLOSTRID* 20
HITS-TERMS CONTAINING THIS STEM 5 CLOSTRIDIUM 2 CLOSTRIDIUM BIFERMENTANS 2 CLOSTRIDIUM BOTULINUM 1 CLOSTRIDIUM CAPTOVALE 1 CLOSTRIDIUM CARNIS 1 CLOSTRIDIUM CHAUVOET 1 CLOSTRIDIUM DIFFICILE 1 CLOSTRIDIUM HEMOLYTICUM 1 CLOSTRIDIUM HISTOLYTICUM 1 CLOSTRIDIUM NOVYI 1 CLOSTRIDIUM PERFRINGENS 1 CLOSTRIDIUM PUTREFACIENS 1 CLOSTRIDIUM SEPTICUM 2 CLOSTRIDIUM SPORELLII 1 CLOSTRIDIUM SPOROGENES 1 CLOSTRIDIUM SUBTERMINALE 1 CLOSTRIDIUM TERTIUM 1 CLOSTRIDIUM TETANI 1 CLOSTRIDIUM TETRAMORPHUM	HITS-TERMS CONTAINING THIS STEM 5 CLOSTRIDIUM 2 CLOSTRIDIUM BIFERMENTANS 2 CLOSTRIDIUM BOTULINUM 1 CLOSTRIDIUM CAPTOVALE 1 CLOSTRIDIUM CARNIS 1 CLOSTRIDIUM CHAUVOET 1 CLOSTRIDIUM DIFFICILE 1 CLOSTRIDIUM HEMOLYTICUM 1 CLOSTRIDIUM HISTOLYTICUM 1 CLOSTRIDIUM NOVYI 1 CLOSTRIDIUM PERFRINGENS 1 CLOSTRIDIUM PUTREFACIENS 1 CLOSTRIDIUM SEPTICUM 2 CLOSTRIDIUM SPORELLII 1 CLOSTRIDIUM SPOROGENES 1 CLOSTRIDIUM SUBTERMINALE 1 CLOSTRIDIUM TERTIUM 1 CLOSTRIDIUM TETANI 1 CLOSTRIDIUM TETRAMORPHUM
END OF TERMS CONTAINING THIS STEM	END OF TERMS CONTAINING THIS STEM

XIV. STEM SEARCH OPTION

XV. DISPLAY INTERRUPT (USER ABORT)

The user may wish to interrupt the display. This may be particularly true if the computer is printing a lengthy search. If he depresses simultaneously, printing will cease and the computer will wait for the next command. Several options can be used. 1. To resume printing without loss of message 2. To suspend readout <i>Note: Each time CONTROL/Z followed by S is entered, 10 lines of printout will be skipped. The print-out will then be resumed until CONTROL/Z and S are depressed again. When the printout is completed, the user has the option of LOGOUT or resuming his search by entering a new term.</i> 3. Full user abort from BASIS. This will cause the user to exit the BASIS Information System, but remain connected to the computer. He has the option of again requesting BASIS or LOGOUT. Caution: If the user has requested an off-line printout, the use of Option 3, the full user abort from BASIS, will cause the loss of the printout. AMIC cannot be responsible for delivery of the printout under these circumstances. Normal LOGOUT procedures should be followed.	<u>CONTROL and Z</u> Carriage return <u>S</u> <u>A</u>
--	--

XV. DISPLAY INTERRUPT (USER ABORT)

XVI. QUIT AND LOGOUT

The LOGOUT procedure is simple, but should be followed carefully. When the user is satisfied with the results of his search and decides to terminate, he should enter the command The system will respond	XX/(QUIT) IF YOU DESIRE FURTHER AMIC ASSISTANCE CALL AREA 614, 299-3151, Extension 3264. B A S I S . 7 0 HAS ENJOYED SERVING YOU. (DONT FORGET TO "LOGOUT." BEFORE DISCONNECTING.) GOODBYE..... 17.20.48.END BASIS COMMAND- <u>LOGOUT.</u> CP TIME 1.488 PP TIME 41.800 CONNECT TIME 0 HRS. 16 MIN. 01/13/72 LOGGED OUT AT 17.21.15.< MP
At this point, the user has left the information system, but is still connected to the computer which will send the message: The user then must enter After the computer sends the final statistics, the user should disconnect the telephone and turn off the equipment. <i>Note: If you have had any difficulty or fail to be satisfied by your search, please call AMIC immediately. The Center may be able to assist you off-line.</i>	

XVI. QUIT AND LOGOUT

XVII. SHORT FORM LOGOUT

A short form LOGOUT is also available which reduces the time required to logout. At any point in the search, the user may simply type...

The computer will respond with

LOGOUT.

GOODBYE
CP TIME 1.488
PP TIME 41.800
CONNECT TIME 0 ERS. 16 MIN.
01/13/72 LOGGED OUT AT 17.21.15.

Revised 4/17/72

XVII. SHORT FORM LOGOUT

SECTION XVIII

SAMPLE QUERY

NOTE: Underlines denote user actions.

BATTELLE INTERCOM 3.0

DATE 01/13/72

TIME 17.04.55.

PLEASE LOGIN.

LOGIN.

ENTER USER NAME- AAAAAAAAA

ENTER PASSWORD- 99999999

the user logs in.
Each user or user group
is assigned a valid user
name and password.

01/13/72 LOGGED IN AT 17.05.43.

WITH USER-ID KY

EQUIP/PORT 60/05

CONNAID- BASIS.

(PHASE I) B A S I S 7 0

IS ON LINE!

DO YOU DESIRE OPERATING INSTRUCTIONS?

TYPE YES OR NO/NO

PLEASE ENTER YOUR LAST NAME. /DARBY

ENTER THE NAME OF DATA BASE TO BE SEARCHED.

/ AMIC

AMIC DATA BASE SPONSORED BY EPA

UNDER CONTRACT 68-01-0166

TOTAL ITEMS IN BASE xx,xxx

LATEST UPDATE mm/dd/yy

ENTER YOUR SEARCH ONE TERM AT A TIME.

1/ DDT

25 ITEMS

2/ GAS CHROMATOGRAPHY

39 ITEMS

3/ SEPARATION TECHNIQUES

27 ITEMS

4/ (1A2A3)

5 ITEMS

ENTER YOUR REQUEST

5/ CHEMICAL INTERFERENCES

NO SUCH TERM. WANT ADJACENT TERMS? YES:NO/YES

ITEMS-NEARBY TERMS TO YOUR TERM

1 CHEMICAL INDUSTRY

23 CHEMICAL INTERFERENCE

*** (YOUR TERM)

8 CHEMICAL OXYGEN DEMAND

1 CHEMICAL PARTITIONING

5/ CHEMICAL INTERFERENCE

23 ITEMS

the query is initiated

the user constructs a
logical combination

invalid entry

nearby terms are
displayed

A-2

6/ (4A5)
2 ITEMS
ENTER YOUR REQUEST
7/ (DISPLAY 6)
THE DATA ELEMENTS FOR THE AMIC DATA BASE ARE
1-ACCESSION NUMBER,
2-FACILITY,
3-TITLE,
4-AUTHOR(S),
5-BIBLIOGRAPHIC DATA,
6-INDEX TERMS,
7-ABSTRACT.
WHAT FIELDS DO YOU WANT TO SEE?
ENTER FIELD NUMBERS SEPARATED BY COMMAS OR ALL
/ 1,4,2,3,5
ITEMS FROM THE AMIC DATA BASE ARE
ITEM 1
ACCESSION NUMBER : 627
AUTHOR(S) : BREIDENBACH, A. W., LICHTENBERG, J. J., HENKE, C. F., SMITH, D. J., EICHENBERGER, J. W., JR., STIERLI, H.
FACILITY : FEDERAL WATER POLLUTION CONTROL ADMINISTRATION, WASHINGTON, D. C., DIVISION OF POLLUTION SURVEILLANCE
TITLE : THE IDENTIFICATION AND MEASUREMENT OF CHLORINATED HYDROCARBON PESTICIDES IN SURFACE WATERS,
BIBLIOGRAPHIC DATA : WP-22, NOVEMBER 1966
70 P. 38 FIG, 2 TAB, 71 REF.
ITEM 2
ACCESSION NUMBER : 1029
AUTHOR(S) : LAW, LEROY M., GOERLITZ, DONALD F.
FACILITY : U. S. GEOLOGICAL SURVEY, MENLO PARK, WATER RESOURCES DIVISION
TITLE : MICROCOLUMN CHROMATOGRAPHIC CLEANUP FOR THE ANALYSIS OF PESTICIDES IN WATER,
BIBLIOGRAPHIC DATA : JOURNAL OF THE ASSOCIATION OF OFFICIAL ANALYTICAL CHEMISTS, VOL. 53, NO. 6, P 1276-1286, NOVEMBER 1970, 5 FIG, 6 TAB, 23 REF.
FINISHED WITH PRINTOUT. CONTINUE ENTERING SEARCH TERMS.
7/ (DISPLAY (1029))
WHAT FIELDS DO YOU WANT TO SEE?
/ 7
ITEMS FROM THE AMIC DATA BASE ARE
ITEM 1
ABSTRACT : RAPID AND ECONOMICAL REMOVAL OF EXTRANEOUS CO-EXTRACTIVES FROM PESTICIDE RESIDUE EXTRACTS OF WATER IS MADE POSSIBLE
the user refines the logical combination
the items are retrieved
data elements are printed only once for each search
the system prints the desired data base elements
the user desires to see the abstract for item 1029.

SSIBLE BY THE USE OF MICRO-CLEANUP COLUMNS. THREE ABSORBENTS--ALUMINA, SILICA GEL, AND FLORISIL--AS WELL AS A VARIETY OF SOLVENT SYSTEMS WERE INVESTIGATED. THE RECOVERY AND CLEANUP OF ALDRIN, CHLORDAN, DDT, DIELDRIN, ENDRI, HEPTACHLOR, HEPTACHLOR EPOXIDE, HEXACHLOROBICYCLOHEPTADIENE, HEXACHLOROCYCLOPENTADIENE, ISODRI, LINDANE, AND METHOXYCHLOR WERE SATISFACTORY, USING ANY OF THE THREE ABSORBENTS. THE PHOSPHOROTHIOATE PESTICIDES MALTION, METHYL PARATHION, AND PARATHION, HOWEVER, COULD NOT BE SUCCESSFULLY RECOVERED FROM FLORISIL WHEN A MODIFIED MILLS PROCEDURE WAS ATTEMPTED. THE MICRO-CLEANUP COLUMNS MAY ALSO BE USED TO PERFORM A PRELIMINARY SEPARATION OF A NUMBER OF COMPOUNDS THAT ARE DIFFICULT TO RESOLVE BY GLC.

FINISHED WITH PRINTOUT. CONTINUE ENTERING SEARCH TERMS.

7/ (LIST ALL)

the LIST option is used

ITEMS-NO.-LINE---

*** 25 1/DDT
 *** 39 2/GAS CHROMATOGRAPHY
 *** 27 3/SEPARATION TECHNIQUES
 *** 5 4/(1A2A3)
 *** 23 5/CHEMICAL INTERFERENCE
 *** 2 6/(4A5)

ENTER YOUR REQUEST

7/ METABOLITES

the user modifies the query

7 ITEMS

8/ (1A3A7)

2 ITEMS

ENTER YOUR REQUEST

9/ (DISPLAY 8)

new items are retrieved and printed

WHAT FIELDS DO YOU WANT TO SEE?

/ 1,3,4,5

ITEMS FROM THE AMIC DATA BASE ARE

ITEM 1

ACCESSION NUMBER : 577

TITLE : PESTICIDE RESIDUES IN CHANNEL CATFISH FROM NEBRASKA,

AUTHOR(S) : STUCKY, H. P.

BIBLIOGRAPHIC DATA : PESTICIDES MONITORING JOURNAL, VOL. 4, NO. 2, P 62-66, SEPTEMBER 1970. 2 FIG, 3 TAB, 13 REF.

ITEM 2

ACCESSION NUMBER : 1029

TITLE : MICROCOLUMN CHROMATOGRAPHIC CLEANUP FOR THE ANALYSIS OF PESTICIDES IN WATER,

AUTHOR(S) : LAW, LEROY M., GOERLITZ, DONALD F.

A-4

BIBLIOGRAPHIC DATA : JOURNAL OF THE ASSOC
IATION OF OFFICIAL ANALYTICAL CHEMISTS,
VOL. 53, NO. 6, P 1276-1286, NOVEMBER 19
70. 5 FIG, 6 TAB, 23 REF.

FINISHED WITH PRINTOUT. CONTINUE ENTERING SEARCH TERMS.

9/ (QUIT)

the search is terminated

IF YOU DESIRE FURTHER AMIC ASSISTANCE

CALL AREA 614,299-3151, Extension 3264.

B A S I S 7 0 HAS

ENJOYED SERVING YOU.

DO YOU HAVE ANY COMMENTS?

YES:NO/NO

(DONT FORGET TO "LOGOUT." BEFORE DISCONNECTING.)

GOODBYE.....

17.20.48.END BASIS

COMMAND- LOGOUT

CONTROL CARD ERROR

COMMAND- LOGOUT.

CP TIME 1.488

PP TIME 41.800

CONNECT TIME 0 HRS. 16 MIN.

01/13/72 LOGGED OUT AT 17.21.15.<

MP

the user logs out and...

*...turns off the
terminal*

XIX. TITLE WORD (TW) SEARCHES

Many older documents containing information important to analytical methodology have been collected by AMIC. However, since the emphasis of AMIC has been upon current literature, these older documents have not been abstracted and indexed for inclusion in the data base. In order to make these older documents available to AMIC users, they are being machine-indexed by title, authors, and facilities. This section of the AMIC USER GUIDE describes suggested search procedures for this older literature. Assume you want to search titles of older literature for information on heavy metals in water and wastes. The first step is to think of all words that authors might use in their titles. Possible terms are HEAVY METALS, ELEMENTS, LEAD, CADMIUM, THALLIUM, COPPER, MERCURY, TRACE METALS, ZINC, WATER, SEWAGE, WASTE, SLUDGE, and EFFLUENT. (There may be others.) Rule: When making title word searches, the search word must be preceded by TW. The first suggested term is HEAVY METALS. Rule: Machine indexing does not recognize paired words unless they are connected by a hyphen or other connecting symbol. (An example would be GAS-LIQUID.) Hence, in a title word (TW) search, HEAVY METALS would be indexed as two separate words. The word HEAVY could be entered as shown. The present response would be	1/ TW 1/ TW HEAVY NO SUCH TERM. WANT ADJACENT TERMS? YES:NO/<u>NO</u>

XIX. TITLE WORD (TW) SEARCHES

XIX. TITLE WORD (TW) SEARCHES (Continued)

Entering the next word Rule: <i>Machine indexing does not recognize singulars and plurals as being the same word, but rather as two separate and distinct words. Therefore, singulars and plurals must both be entered separately.</i> There is a strategy that can be used to assure that all variations of a term are covered. This is the stem search. See Section XIV. If the stem META* had been entered the response would have been Warning: <i>Always enter the shortest form of the word for a stem search. Never enter a plural form. Useful variations would be missed.</i> The user could then enter the two relevant terms. It is strongly urged that the user make free use of the stem search option when searching TW in order that all variations of the search word are used.	1/ <u>TW METALS</u> 4 ITEMS. 2/ <u>TW METAL</u> 2 ITEMS 1/ <u>TW META*</u> 1 TW METABOLISM 2 TW METAL 4 TW METALS 1/ <u>TW METAL</u> 2 ITEMS 2/ <u>TW METALS</u> 4 ITEMS.
---	--

XIX. TITLE WORD (TW) SEARCHES (Continued)

XIX. TITLE WORD (TW) SEARCHES (Continued)

At this stage of development, many of the TW terms, which should be valid, have not yet appeared in titles entered into the file. Hence, there are no records for many of the suggested terms.	ENTER REQUEST. 3/ TW ELEMEN* THERE ARE NO RECORDS FOUND CONTAINING THIS STEM ENTER REQUEST. 3/ TW LEAD* THERE ARE NO RECORDS FOUND CONTAINING THIS STEM ENTER REQUEST. 3/ TW CADMIUM* THERE ARE NO RECORDS FOUND CONTAINING THIS STEM ENTER REQUEST. 3/ TW THALLIUM* THERE ARE NO RECORDS FOUND CONTAINING THIS STEM ENTER REQUEST. 3/ TW COPPER* HITS-TERMS CONTAINING THIS STEM 1 TW COPPER END OF TERMS CONTAINING THIS STEM ENTER REQUEST. 3/ TW COPPER 1 ITEM 4/ TW MERCURY* HITS-TERMS CONTAINING THIS STEM 11 TW MERCURY 1 TW MERCURY(II) END OF TERMS CONTAINING THIS STEM. ENTER REQUEST. 4/ TW MERCURY 11 ITEMS 5/ TW MERCURY(II) 1 ITEM 6/ TW TRACE* HITS-TERMS CONTAINING THIS STEM 8 TW TRACE END OF TERMS CONTAINING THIS STEM ENTER REQUEST. 6/ TW TRACE 8 ITEMS
A Hit! As soon as a term is identified, it may be entered as a search term.	

XIX. TITLE WORD (TW) SEARCHES (Continued)

XIX. TITLE WORD (TW) SEARCHES (Continued)	XIX. TITLE WORD (TW) SEARCHES (Continued)
7/ TW ZINC*	7/ THERE ARE NO RECORDS FOUND CONTAINING THIS STEM
7/ TW WATER*	ENTER REQUEST.
HITS-TERMS CONTAINING THIS STEM	
39 TW WATER	
10 TW WATERS	
END OF TERMS CONTAINING THIS STEM	
ENTER REQUEST	
7/ TW WATER	
39 ITEMS	
8/ TW WATERS	
10 ITEMS	
9/ TW SEWAGE*	
HITS-TERMS CONTAINING THIS STEM	
1 TW SEWAGE	
END OF TERMS CONTAINING THIS STEM	
ENTER REQUEST.	
9/ TW SEWAGE	
1 ITEM	
10/ TW WASTE*	
HITS-TERMS CONTAINING THIS STEM	
3 TW WASTE	
2 TW WASTEWATER	
1 TW WASTEWATERS	
END OF TERMS CONTAINING THIS STEM	
ENTER REQUEST.	
10/ TW WASTE	
3 ITEMS	
11/ TW WASTEWATER	
2 ITEMS	
12/ TW WASTEWATERS	
1 ITEM	
13/ TW SLUDGE*	
HITS-TERMS CONTAINING THIS STEM	
1 TW SLUDGE	
END OF TERMS CONTAINING THIS STEM	
ENTER REQUEST.	
13/ TW SLUDGE	
1 ITEM	

XIX. TITLE WORD (TW) SEARCHES (Continued)

Now that all useful terms and their variations have been entered, it may be of value to display the total search. Use the (LIST ALL) command. See Section XII. The computer will respond <i>Nota:</i> Some users, having printers, may wish to enter all stem searches at one time and then enter all legitimate terms. This option will not work for those users having only limited CRT capacity since they will not be able to refer to a list of legitimate terms without going through the LIST ALL option.	14/ TW EFFLUENT* HITS-TERMS CONTAINING THIS STEM 3 TW EFFLUENTS END OF TERMS CONTAINING THIS STEM ENTER REQUEST. 14/ TW EFFLUENTS 15/ 3 ITEMS 15/ (LIST ALL) ITEMS--NO.--LINE-- 2 1/TW METAL 4 2/TW METALS 1 3/TW COPPER 11 4/TW MERCURY 1 5/TW MERCURY(II) 8 6/TW TRACE 39 7/TW WATER 10 8/TW WATERS 1 9/TW SEWAGE 3 10/TW WASTE 2 11/TW WASTEWATER 1 12/TW WASTEWATERS 1 13/TW SLUDGE 3 14/TW EFFLUENTS
	XIX. TITLE WORD (TW) SEARCHES (Continued)

XIX. TITLE WORD (TV) SEARCHES (Continued)

Care should be exercised in reframing the question in Boolean logic. It would be restated as these documents concerning METAL OR METALS OR COPPER OR MERCURY OR MERCURY(II) OR TRACE AND WATER OR WASTERS OR SEWAGE OR WASTE OR WASTEWATER OR WASTEWATERS OR SLUDGE OR EFFLUENTS.

Warning: In entering logical statements into AMIC, no statement should contain more than 9 line numbers in any Boolean statement, or one line across the CRT.

The first step, then would be to enter the first set of like items using OR logic.

The next set of OR logic may be entered.

Then do the AND logic

The next step is to display the 3 identified items.

Caution: Two further points need to be made:
1. AND correlations between title words and normal index terms will cause loss of retrieval. However, you may correlate facilities and authors with title words. (See Section VI for facility and author searches.)
2. Do not try to make extensive correlations on title words such as "mass spectrometry of heavy metals in water". Title word searches will be more productive if broad searches are made and the display capability is used to "browse" through titles.

15/ (1 OR 2 OR 3 OR 4 OR 5 OR 6)
21 ITEMS
ENTER YOUR REQUEST
16/ (7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14)
54 ITEMS
ENTER YOUR REQUEST
17/ (15 AND 16)
3 ITEMS
ENTER YOUR REQUEST.
18/ DISPLAY 17
WHICH DATA ELEMENTS DO YOU WANT TO SEE?
/ALL
ITEMS FROM THE AMIC DATA BASE ARE.....
ITEM 1
ACCESSION NUMBER : 109
TITLE : MERCURY IN WATER SUPPLIES.
BIBLIOGRAPHIC DATA : AMERICAN WATER WORKS
ASSOCIATION JOURNAL, VOL. 62, NO. 5,
P 285, MAY 1970. 3 REF.
ABSTRACT : DOCUMENT NOT YET ABSTRACTED.
ITEM 2
ACCESSION NUMBER : 1630
TITLE : MEMBRANE PROBE-SPECTRAL EMISSION TYPE DETECTION SYSTEM FOR MERCURY IN WATER,
AUTHOR(S) : BRAUN, R. S.

XIX. TITLE WORD (TV) SEARCHES (Continued)

XIX. TITLE WORD (TW) SEARCHES (Continued)

BIBLIOGRAPHIC DATA : ANALYTICAL CHEMISTRY,
VOL. 43, NO. 11, P 1462-1467, SEPTEMBER
1971. 6 FIG, 2 TAB, 19 REF.
ABSTRACT : DOCUMENT NOT YET ABSTRACTED.

ITEM 3

ACCESSION NUMBER : 1695

TITLE : USE OF ANION EXCHANGE RESIN-LOADED PAPER
IN THE DETERMINATION OF TRACE MERCURY IN
WATER BY NEUTRON ACTIVATION ANALYSIS,
AUTHOR(S) : BECKNELL, D. E.; MARSH, R.H.;
ALLIE, W. R., JR.

BIBLIOGRAPHIC DATA : ANALYTICAL CHEMISTRY,
VOL. 43, NO. 10, P 1230-1233, AUGUST '71
1971. 2 FIG, 2 TAB, 7 REF.
ABSTRACT : DOCUMENT NOT YET ABSTRACTED.

FINISHED WITH PRINTOUT. CONTINUE ENTERING SEARCH
TERMS.

XIX. TITLE WORD (TW) SEARCHES (Continued)

APPENDIX E. RESPONSES TO AMIC QUICK RESPONSE
INQUIRIES



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ENVIRONMENTAL RESEARCH CENTER
CINCINNATI, OHIO 45268

July 31, 1972

Mr. Robert L. Little, Project Leader
Analytical Methodology Information Center
Battelle Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

Dear Bob:

Thank you for the copy of QRI-30, "Methods for Preconcentration for Analysis of Trace Metals in Marine Sediments." It would appear that you have done a very thorough literature search. As best I can determine, there are only a few that I am aware of that you missed. I am enclosing Xerox copies of these four papers which you may keep for your files.

Sincerely yours,

John F. Kopp, Group Leader
Trace Metals Analyses

4 Enclosures

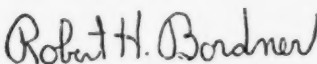
CC: Dr. C. I. Weber, Chief, Biological Methods, AQCL

ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ENVIRONMENTAL RESEARCH CENTER
Cincinnati, Ohio 45268

Date: March 14, 1972
Reply to
Attn of: Analytical Quality Control Laboratory
Subject: Evaluation of QRI-16
To:

C. I. Weber
Chief, Biological Methods
Analytical Quality Control Laboratory

We appreciate the rapid response (10 days) and the brief concise format of QRI-16 "Analytical Methods for Bacteria in Chlorinated Wastewater and Sediments". We did not expect many items closely related to the subject request. Of the 10 abstracts submitted, all were related to the request and 8 were very helpful. The objectives of the planned research problems were obviously clearly understood by the searchers and this grasp of the problem is reflected in the results from the literature search.


Robert H. Bordner
Chief,
Microbiological Methods

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
DIVISION OF FIELD INVESTIGATIONS—DENVER CENTER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

5 September 1972

Mr. Robert L. Little
Project Leader
Analytical Methodology
Information Center
Battelle, Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

Dear Mr. Little:

The latter part of August I had the opportunity to discuss QRI-23, "E. coli as a Pollution Indicator" with one of your abstractors (Miss Holomon). At that time, I pointed out our particular interest in the literature on methods of detecting E. coli in natural waters and shellfish. This was an "after thought" and not part of the original request made through Mr. Bordner last June. Nevertheless, we were pleasantly surprised when the bibliography was received on August 25, 1972 and it contained a section concerned with methods.

I have had the opportunity to read through this abstracted bibliography prepared by your staff. It is excellent and will certainly be helpful in evaluating the use and abuse of E. coli as an indicator of pollution in shellfish harvest waters.

Sincerely,



Robert F. Schneider
Chief, Biology Branch

RFS/lis

cc: Bordner

ENVIRONMENTAL PROTECTION AGENCY
National Environmental Research Center--Corvallis
Southeast Environmental Research Laboratory
Athens, Georgia 30601

October 13, 1972

Dr. Robert L. Little
Analytical Methodology Information Center
Battelle Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

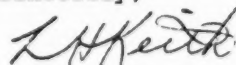
Dear Bob:

I have received QRI-38, "Identification, Analysis and Effects of Organic Compounds in Kraft Paper Mill Wastes." The delay did not affect our study; we will make the most use of it over the next 4-6 months.

I am very pleased with the results--especially the index. In reference material of this kind the usefulness of it is often governed by how comprehensive the index is and I was pleased to find not only subject areas but also individual compounds listed. That will be a very beneficial service.

Thank you for your help in this project.

Sincerely,



Lawrence H. Keith
Research Chemist

Contaminants Characterization Program

cc: Dr. Cornelius J. Weber
EPA, AQCL
Cincinnati, OH

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
DIVISION OF FIELD INVESTIGATIONS - DENVER CENTER
BUILDING 22 , ROOM 410 , DENVER FEDERAL CENTER
DENVER, COLORADO 80225

TO : Dr. Cornelius I. Weber, Project Officer
AQC Laboratory

DATE: June 27, 1972

FROM : OR & M Technical Liaison Officer

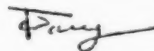
SUBJECT: Quick Response inquiry

In response to our telephone conversation of June 23, 1972, I am making a request for a QRI on the following:

Any information as to the effects of chromium (any oxidation state) on sewage treatment processes and vice versa.

QRI's -12 and -15 have been useful in identifying the current pollutional problems and potential problems with sewage treatment.

Again may I thank you for the excellent assistance which you have given us.



Douglas B. Seba, Ph.D.

DBS/cw

ENVIRONMENTAL PROTECTION AGENCY
WATER QUALITY OFFICE
DIVISION OF FIELD INVESTIGATIONS—DENVER CENTER
BUILDING 53, BOX 25227 DENVER FEDERAL CENTER
DENVER, COLORADO 80225

29 September 1972

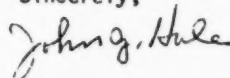
Mr. Robert L. Little, Project Leader
Analytical Methodology Information Center
Battelle, Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

Dear Mr. Little:

In several of our recent field investigations we have been involved with heavy metals and especially chromium. We have done some searching in the literature regarding their effect on sewage treatment, but the press of other duties had made it impossible to make a complete search.

Your report on the *Effects of chromium on sewage treatment and the effects of sewage treatment on chromium* answered our questions on the deleterious effects of chromium both on sewage treatment processes and on equipment, and the necessity of chromium removal by a pre-treatment process. Thank you for a most thorough review on this matter.

Sincerely,



John G. Hale
Aquatic Biologist

cc: Thomas P. Gallagher
Douglas B. Seba

JGH/lms

ENVIRONMENTAL PROTECTION AGENCY
National Environmental Research Center
Research Triangle Park, N. C. 27711

July 11, 1972

Robert L. Little
Analytical Methodology Information Center
Battelle Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

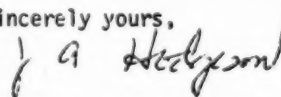
Dear Mr. Little:

I have reviewed the list of abstracts you sent me in response to QRI-22 on resonance fluorescence. Several reports were described, of which I was unaware, and I have ordered copies from the authors or NTIS.

For your information, the general area of Raman scattering was not the area of interest and was over-emphasized in the search. Also I already have several quite pertinent articles, principally from J. Chem. Phys., on OH and O atom resonance fluorescence which were not revealed in the list you sent me.

Once again, thank you for your assistance.

Sincerely yours,



Jimmie A. Hodgeson, Ph.D.
Field Methods Development Section
Division of Chemistry and Physics

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

REGION VII
1735 BALTIMORE - ROOM 249
KANSAS CITY, MISSOURI - 64108

March 6, 1972



IN REPLY REFER TO: SVAN-TECH

Dr. Cornelius I. Weber
Chief, Biological Methods
Analytical Quality Control
1014 Broadway
Cincinnati, Ohio 45202

Dear Dr. Weber:

Reference is made to your Memorandum of February 25, 1972, and our previous discussions concerning Analytical Methods for Diethylstilbestrol. Our Region is currently conducting field studies of oxidation ditch treatment of cattle feedlot wastes. We are in the process of making a decision concerning the inclusion of diethylstilbestrol in our scope of study. The information you have provided through QRI No. 13 and your above mentioned memorandum had given us a solid basis for our decisions. We feel that in this situation the QRI was most useful.

Sincerely yours,

Carl M. Walter
Carl M. Walter

Chief, Technical Support Branch